

CCc  
.41  
Fil



POST GRADUATE STUDIES

FOR

PHARMACIST MATES

OF THE

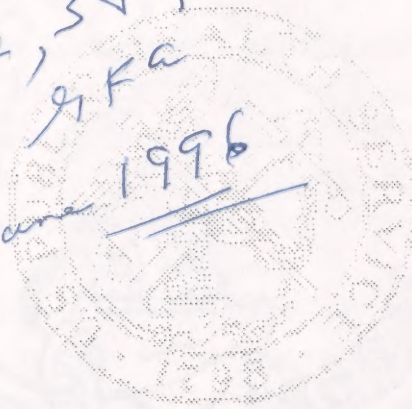
COAST GUARD AND MARITIME SERVICES

13

*Personal copy to  
my friend The FDR -  
Historian*

*Note  
pages 1D, 2, 3 + 4  
91FA*

*compiled Jan 1996*



U.S. MARINE HOSPITAL

BOSTON, MASS.

U.S. PUBLIC HEALTH SERVICE

1944



(NLM)



## Foreword

This reproduction of selected and edited materials is dedicated to those men of the Coast Guard and United States Marine Service who undertook these postgraduate studies at the Boston United States Marine Hospital, now renamed the U.S. Marine Hospital, during World War II (1942-1945) on completion of their studies at Annapolis, Maryland or at the Naval Academy, Annapolis, Maryland.

These men, who were selected for these studies, were: 1. George F. Archibald, Jr., U.S. Marine Corps, Captain, who was assigned to the U.S. Marine Hospital, Boston, Massachusetts, in 1942, and who was assigned to the U.S. Marine Hospital, Boston, Massachusetts, in 1943, and who was assigned to the U.S. Marine Hospital, Boston, Massachusetts, in 1944, and who was assigned to the U.S. Marine Hospital, Boston, Massachusetts, in 1945.

It is hoped that these materials will be of interest and value to the men of the Coast Guard and United States Marine Service, especially those who are interested in the history of the Coast Guard and United States Marine Service, and that it will bring them pleasure.

George F. Archibald, Jr., Sr.  
Rear Admiral, USN

April 1946





## Foreword

This reproduction of lectures and allied materials is dedicated to those men of the Coast Guard and Merchant Marine Service who undertook these post-graduate studies at the Boston United States Marine Hospital (later renamed the U.S.P.H.S. Hospital) during World War II (circa 1944) upon completion of their studies at Sheepshead Bay or Columbia

## Acknowledgments

I am indebted to my sons, George F. Archambault, Jr., a Northwest Airlines Airbus A-320 Captain and a Commissioned Officer in the U.S. Air Force during the Vietnam War and William H. Archambault, a Commissioned Officer in the U.S. Naval Reserve, Judge Advocate General's Corps who encouraged me to reproduce these materials.

I am especially indebted to my daughter, Patricia Kachik (a Red Cross Apheresis Nurse) who was responsible for reproducing and collating the some 200 pages of the 40-plus year old, aged and yellowed document that I found in my files.

To those U.S.P.H.S. Commissioned Officers and their friends, especially those who are Civil Service U.S.P.H.S. (retired and active) reading this history, I hope it will bring much pleasure.

George F. Archambault, Sr.  
Bethesda, Maryland  
June 1996





~~SECRET~~

POST GRADUATE STUDIES

for

PHARMACIST MATES

of the

COAST GUARD AND MARITIME SERVICE

U. S. MARINE HOSPITAL

Your best is only your best.

BOSTON, MASS.

U. S. PUBLIC HEALTH SERVICE

1944

E. C. Jenkins, F. A. Suckman  
Director of Studies





PRETACE.

~~5~~  
2

A common complaint against medical school professors is that they teach "too little by teaching too much." The officers, pharmacist and nurses at this hospital who are giving of their time and energy to teach these classes, have tried to overcome this criticism. The medical information discussed in the lectures has been reduced to an irreducible minimum. We have attempted to sacrifice theory and only present practical points that can be used aboard ship. However, the knowledge you gain here also depends upon the amount of time you spend at study, the manner in which you apply yourself to ward duty, and your receptiveness to constructive criticism. As the old trite expression goes, "You will only get out of it, what you put in it." We can only hope that you exert your best effort. Your best is only your duty.

E. C. Jenkins, P. A. Surgeon  
Director of Studies



8 = 1  
3

LECTURES

Revised May 17, 1944

TITLE

INSTRUCTOR \*

- |   |                                |
|---|--------------------------------|
| 1) Diagnoses and Treatment Aboard Ship<br>by Pharmacist Notes             | E. C. Jenkins, P. A. Surgeon   |
| 2) Pharmaceutical Mathematics   | G. F. Archambault, Ph. C. ✓    |
| 3) Essentials of Compounding  | G. F. Archambault, Ph. C. ✓    |
| 4) Technique for Scrubbing and Setting<br>up Operating Room               | Lula Bond, R.N.                |
| 5) Sterile Technique  | Esther Welch, R.N.             |
| 6) Treatment of Immersion Foot, Burns,<br>Frostbite and Shock             | E. C. Jenkins, P. A. Surgeon   |
| 7) Bandaging  | C. B. Moyes, P. A. Surgeon     |
| 8) Plaster Casts  | J.R. Mickerson, Asst. Surg.(R) |
| 9) Fractures, Dislocations, Sprains,<br>Gunshot Wounds, Head Injuries.    | A.B. Kurlander, P.A. Surgeon   |
| 10) Treatment of the Wounded by<br>Pharmacist Notes                       | E. C. Jenkins, P. A. Surgeon   |
| 11) A Warning About the Sulfa Drugs                                       | C. B. Moyes, P. A. Surgeon     |
| 12) Instructions to Pharmacist's Notes<br>in the Use of Anesthesia        | E. C. Jenkins, P. A. Surgeon   |
| 13) Practical Splinting   | R.A. Bonner, Asst. Surg. (R)   |
| 14) Ship Sanitation   | A.B. Kurlander, P.A. Surgeon   |
| 15) Written Examination   |                                |
| 16) Requisition for Medical Supplies - Coast Guard Vessels                |                                |
| 17) Minimum Requirement List - Medical Supplies - Merchant Marine Vessels |                                |

\* Note: - There were 8 instructions -

5 M.D.'s

2 Nurses

1 Pharmacist





COMPOUNDING, STOCKING AND DISPENSING OF MEDICATIONS  
FOR  
COAST GUARD AND MERCHANT MARINE PHARMACIST MATES  
.....

\*Chief Pharmacist, George F. Archambault, Ph. G. Ph. C.  
United States Marine Hospital, Boston, Mass.

Revised May 17, 1944

The Medical Officer in Charge of this hospital has informed me that you men are to be "Doctor, Pharmacist and Nurse" to your shipmates once your vessel leaves port. This places a serious responsibility upon your shoulders. In some instances, where your ship is far from the outposts of civilization or where communication channels are unavailable for war reasons, important decisions must be made by you alone. I hope that you will bear this thought in mind as the members of the hospital staff take you through the essentials considered necessary to discharge your duties properly and that you will not hesitate to question us concerning problems which perplex you.

My particular assignment is not to teach you the profession of pharmacy. The essentials of the profession that are considered necessary for you to master have already been presented to you at Sheepshead Bay or at Columbia. My task is to review some of the "highlights" of the course already presented to you, with the viewpoint of reminding you to "play safe".

PART ONE:

1. Colloidal silver solutions should be prepared freshly. If a large amount is being used, it is wise not to prepare over a week's supply. Such stock solutions decompose on standing and become irritating to delicate mucous membranes. Examples of such solutions are the mild and strong protein silver solutions such as argyrol and protargol.
2. Distilled water should be used in compounding liquid medications. Under no circumstances should colloidal silver preparations be compounded without proper distilled water. Drinking or tap water is very often purified by chlorination and its use would cause a cloudiness or precipitate of silver chloride which may be injurious to delicate tissue.
3. Where stock solutions are prepared which are prone to decomposition, it is advisable to place an expiration date on the label. Examples of such solutions are the colloidal silver solutions already referred to and Dakin's solution. The latter should not be used beyond 5 days from the date of manufacture.
4. Ophthalmic solutions should always be filtered.
5. Where solutions are prepared for operating and dressing rooms, make certain that such solutions have attached to their containers, tags clearly stating that such solutions are "Not Sterile". This will prevent them from being confused with similar solutions already sterilized. Distilled water and procaine hydrochloride solutions are examples.

\*Member of Faculty of Massachusetts College of Pharmacy.  
(On leave of absence for the duration.)





6. In incorporating a potent chemical with a diluent, where both are solids, the proper technique is to add the diluent gradually to the potent substance. An approved method is to place the potent substance in a mortar and add a volume of the diluent equal to the volume of the potent chemical. When well incorporated, add a volume of diluent equivalent to the volume of the mixture in the mortar. Keep repeating the process the several times necessary to incorporate all the diluent. (Many physicians add a small amount of charcoal to their prescriptions of white powders where potent chemicals are involved. This insures to their satisfaction, complete mixing. The finished product being a uniform gray without black or white specks.)
7. Store Formaldehyde solutions in a WARM place away from the light. Light tends to oxidize formaldehyde solutions to formic acid. Cold temperatures may cause this solution to become turbid because of the separation of paraformaldehyde.
8. Bichloride of Mercury U.S.P. contains an amount of bichloride that will:
  - A. Make a 1:1000 solution when dissolved in one pint of water. (The "Magnae" or large official tablets.)
  - B. Make a 1:4000 solution when dissolved in one pint of water. (The "Parvae" or small official tablets.)

Note this solution is one-fourth as strong as one prepared from the larger tablet.
9. Storage of biologicals: The U.S.P. states that biologicals should be stored between 2 and 10 degrees, centigrade. (Approximately 40 to 45 degrees F.) Preferably at the lower temperature. SMALLPOX VACCINE is the one exception to this rule - this vaccine must be stored at even colder temperatures to insure its value - keep at below freezing. (Use ice cube compartments.)
10. In treating a wound with tincture of iodine, ammoniated mercury ointment should not be applied. A chemical reaction may occur, causing an iodide of mercury to form which is caustic.
11. Ammoniated Mercury Ointment, U.S.P. XII is 5%. The U.S.P. XI ointment is 5%. Make certain which ointment the physician desires, especially when he indicates "half-strength".
12. Whitfield's Ointment (Ointment of Benzoic and Salicylate Acids, N.F. VII Comp. Ointment of Benzoic Acid N.F. VI) is considered too strong in the treating of "Athletes Foot". Many physicians recommend that it be used half-strength.
13. Zinc Sulphate and Zinc Chloride are two chemicals which require great care in dispensing. In ophthalmic solutions of zinc chloride 1/10 to 1% is a safe percentage to use. This salt is more astringent than zinc sulfate.
14. Zinc sulphate Ophthalmic solutions should have a MAXIMUM CONCENTRATION of two grains to the ounce or not over 1/2 of 1%. Many pharmacists make it a rule to purchase their zinc sulphate for ophthalmic prescriptions in very small amounts. This insures an uneffloresced salt. Zinc sulphate U.S.P. contains seven molecules of water. If water has been removed by the atmosphere the salt becomes stronger and harmful consequences to the eye tissue may result.





6 2 6

15. The MAXIMUM CONCENTRATION of bichloride of mercury that should be dispensed in solution for the skin is a 1:500 solution. 1:1000 is the usual strength prescribed.
16. The MAXIMUM CONCENTRATION normally used for a phenolic solution for the ear is 5%. (Used as ear drops.) (A 10% liquified phenol in glycerine is occasionally prescribed for otalgia and acute otitis media. CAUTION - not to be used with perforated ear drums.)
17. Three "MUST" antidotes which should be on every vessel are:
  - \*A. Sodium formaldehyde sulfoxylate amps. - Mercurial poisoning.
  - \*B. Picrotoxin Ampules. - Barbitol poisoning.
  - C. Alkaloidal precipitating agents - Alkaloid poisoning.  
such as tannin, potassium perman-  
ganate, charcoal, etc.

\*( A and B should be used only by M.D.)
18. A 70% by volume alcoholic solution is unsuitable for sterilization purposes. (See Goodman and Gilman), while a 70% by weight alcoholic solution has been found to be ideal. An excellent formula for this solution (A. Ph. A. March, 1943, Vol. IV, No. 3, p. 92) is here presented:
 

Alcohol	95%	810 cc
Aqua qs ad		1000 cc
Mix well.		
19. Castellani's paint which has proven its value in the treatment of "Athlete's Foot" may be made by this formula:
 

Saturated alcoholic solution of basic fuchsin	100 cc
(Solubility of fuchsin is 1 in 25).	
Aqueous solution of Phenol	5% 1000 cc
Filter and add to filtrate	
Boric acid	10 Gm
Allow to stand for two hours and then add	
Acetone	50 Gm
Again allow to stand for two hours and then add	
Resorcinol	100 Gm
Bottle in small amber colored bottles.	
20. Calcium medications tend to increase the effect of digitalis.
21. Sucrose ampules are indicated in cranial operations rather than glucose. See that an adequate supply of each ampule is available for operating rooms.
22. Strong protein silver solutions are commonly dispensed from 1/10 of 1% to 10%. Normally 1/2, 1 and 2% solutions are prescribed.
23. Be watchful of synonyms, especially where there is a chance of serious misunderstanding. Example: Glycin may be either aminoacetic acid or a poisonous photographic developer (P-hydroxyphenylamino acetic acid). Check your incoming supplies carefully.
24. Ointments should be stored in well closed containers which are impervious to fats. Location must be cool.





25. Oxycholesterol, the chief water absorbing principle of wool fat is used alone or with other bases. Aquaphor and Merck's Absorption Base are trade preparations of this character and greatly facilitate the making of ointment carrying large proportions of water.
26. Vegetable oils are unsuitable vehicles for elemental iodine in the preparation of nasal sprays - these oils contain unsaturated double bonds which destroy the elemental iodine and form a compound. Light mineral oil should be used in nasal sprays. The heavy for intestinal lubrication.
27. Milk of Magnesia must be protected from freezing to preserve the colloidal nature of the chemical. Freezing destroys the colloidal character of the particles.
28. Methenamine tablets should be dispensed with sodium acid phosphate to render the urine acid so that the methenamine will be decomposed and disinfect the urine.
29. Always use "External Use", "Shake Well" and "Caution" or "Poison" labels where indicated.
30. ALWAYS dispense medications in fresh, clean containers, with neat and distinct labels. Always prepare labels with ink or typewriter - never with a pencil.
31. Spirit of Nitroglycerine as well as its tablets and the erythritol tetranitrate tablets must be handled with caution. If the solution is spilled or the tablets crushed upon the floor, pour potassium hydroxide solution upon the material at once. This will decompose the chemicals and prevent a possible explosion.
32. Should vials of biological preparations be dropped and contents spilled upon the deck, pour 70% by wgt. alcohol upon the material, follow with strong lysol solution and finally clean the space with Tincture of Green soap. All cleansing rags should be burned. Avoid handling with bare hands.
33. Solution of lead subacetate (Goulard's Extract) should be preserved in well filled stoppered bottles to exclude carbon dioxide which causes a white precipitate of lead carbonate to form.
34. Solutions of silver nitrate should be stored in amber colored bottles with a paraffin coated cork stopper. Light would cause a precipitate of metallic silver. Cork, and other organic material, would also cause this precipitate to form.
35. Alkaline solutions are incompatible with Elixir of Pepsin. Alkaline Solutions cause the enzyme pepsin to be destroyed. Remember this important incompatibility in compounding.
36. Surgical instruments should not be sterilized with hydrogen peroxide or mercuric chloride solutions, the former contain a free acid and the latter deposits mercury on the instruments.



instruments. The sodium bicarbonate prevents rusting and aids in the removal of greasy material which may prevent complete sterilization.

38. An alco-formaldehyde sterilizing solution in considerable favor has the formula:

Formalin	258.000 cc
Potassium Nitrite	0.540 Gm
Sodium Hydroxide Pellets	0.045 Gm
Alcohol 95% q s ad	4000.000 cc (Approx. 1 gallon)

39. Pathological conditions that may result from the indiscriminate use of the following drugs are:

DRUG

PATHOLOGICAL CONDITION

Benzedrine Sulfate

Loss of weight, high metabolic rate, damage to the heart. Nervous system affected.

Sulfapyridine

Agranulocytosis (Absence or deficiency of granular leukocytes) and Hematuria (urine with blood).

Aminopyrine

Agranulocytosis

40. Mild tincture of Iodine U.S.P. XII differs from Tincture of Iodine U.S.P. XII in the following respects: The iodine content of the mild is but 2% while the regular is 7%. The mild is made with sodium iodide and the regular with potassium iodide. In action, the regular tincture tends to be a counterirritant and the mild, a germicide without being irritant.

41. The principle components of the vitamin B complex are:

B<sub>1</sub> or Thiamin Chloride used in the treatment of neuritis, pregnancy and other conditions.

B<sub>2</sub> or Vitamin G or Riboflavin - use not fully established. Considered essential to life, used in photophobia, cheilosis,

Nicotinic Acid or Niacin - Specific in pellegra. Used in treating certain dermatitis conditions.

Filtrate Factor - Essential to life.

Pyridazine or B<sub>6</sub> - Use not fully established. Possibly a specific in anemia.

42. The official dose of a drug may usually be doubled with safety. Hypodermic doses are usually half the oral dose and the rectal doses double the oral. In cases of doubtful dosage consult the Merck Index or the Merck Manual. The Handbook of the Hospital Corps - United States Navy 1939 is an excellent text which should always be at hand.

43. Ointments Where heat is to be used in preparing an ointment, always melt the substance with the highest melting point first, this prevents the accumulation of latent heat and also the injuring of these substances that might be harmed by such high temperatures. Gradually stir fusion-made ointments while cooling to prevent granulation. Where an ointment is prepared by incorporation (with ointment slab and spatula), gradually add the diluent to the finely powdered chemical. If the chemical is a fine powder, levigation with mineral oil before incorporation with the base is an





excellent practice to insure the removal of all gritty particles. 12

Pilular extracts should first be softened with diluted alcohol to the consistency of a viscid liquid before incorporation into the ointment base.

Water soluble salts may first be dissolved in a minimum of water and this solution "picked up" with an oxysterol base such as anhydrous lanolin, before incorporation with the prescribed ointment base. This insures a smooth ointment. (See #25).

44. Potassium Permanganate tablets are stocked in 1 gr., 2 gr., 5 gr., and 7.3 gr. sizes. Determine what grainage or strength solution is desired. A 1:2000 solution is usually prescribed.

45. Where potent chemicals such as strychnine sulphate, codeine sulphate, etc., are to be dispensed in elixir or syrup vehicles, "M.S.A." allows the use of a reasonable amount of distilled water to dissolve the chemical even where no water is called for on the prescription.

46. Rx                    Hydrar. Chlor.  
                          Boric Acid                    aa gr x  
                          Alcohol 70% qs ad    Fl. oz 1  
                          M. et Sig; Ear Drops

The physician has not indicated which chloride of mercury to use - calomel or the bichloride. The pharmacist understands that calomel is indicated in ear drops and not the corrosive bichloride. (A 1:10000 solution of bichloride of mercury is occasionally used as an ear irrigation in otitis media or any profuse discharge.)

47. Sodium barbital and sodium phenobarbital generally form precipitates in their aqueous solutions upon the addition of an excess of free acids. This is due to the decomposition of the sodium salt and the separation of free barbital or phenobarbital, both of which are insoluble in water but soluble in alcohol. A typical prescription to illustrate is here presented:

Rx    Phenobarbital  
      Syrup of Orange  
      Aqua qs ad desired volume  
      M.

The pharmacist understands that the soluble salt must be used. (Sodium Phenobarbital) and that because Syrup of Orange contains Citric Acid, it must first be neutralized with sodium bicarbonate or an acid free syrup of orange prepared to successfully compound this prescription.

48. Because vitamin capsules and tablets are now being used so extensively by even laymen, it is well to have a short summation of their use. Be reminded that in normal times no pharmacist worthy of the name would "counter-prescribe".

<u>Vitamin</u>	<u>Indicated Use</u>
A	Night blindness (Nyctalopia)-Ophthalmic Infections.
B Complex	Loss of weight, loss of appetite. (B <sub>1</sub> is the specific for beri-beri.)
C	Specific for scurvy - prescorbutic conditions.





- 13 10
- D Antirachitic Vitamin, abnormal dentition
  - E Anti-abortion Vitamin, often incorrectly called the antisterility vitamin.
  - X Indicated in prothrombin deficiency. The anti-hemorrhagic vitamin. Aid in blood coagulation where prothrombin is deficient.

49. Avoid such directions on your labels as "As Directed", "Take as Directed". This often confuses the patient. Be specific as to how you wish the medication taken. On all directions of preparations for external use - be specific. The label must clearly indicate that the preparation is not intended for oral administration.
50. Digitalis - Considerable confusion exists concerning this drug due to changes in strengths in the last three U.S.P.'s. In brief, the U.S.P. XI strength is stronger than U.S.P. X, and the U.S.P. XII somewhere between the X and XI. In connection with unit evaluation of this drug the N.N.R. states that 1 U.S. unit or 1 International unit is equivalent to 1.3 Cat. units. Tincture of Digitalis U.S.P. XII is approximately 15-20% weaker than the tincture in the U.S.P. XI, therefore a 15 minim dose should produce the same result as 12½ minims of the old U.S.P. XI tincture.

When engaged in actual compounding, read the doctor's prescription carefully, noting the quantity of each ingredient.

Do not hesitate to ask if in doubt.

Make certain the balance is correctly balanced before weighing.

Check all weights after use.

Always use a piece of pan paper on each pan.

Check all doses.

Check at least twice label of containers - before and after use.

CLEANLINESS and ACCURACY are the two attributes absolutely essential to the pharmacist mate. In compounding and dispensing, the lives of fellow shipmates are in your hands, and it is mandatory that the exact medication ordered be prepared and dispensed properly.



TABLES OF WEIGHTS AND MEASURES

LENGTH:

12 inches equal 1 foot  
3 feet equal 1 yard  
5-1/2 yards equal 1 rod  
320 rods equal 1 mile

TROY TABLE:

24 grs. equal 1 pennyweight (pwt.)  
20 pwt. equal 1 ounce  
12 ounces equal 1 lb.

AVOIRDUPOIS WEIGHT

437.5 grains equal 1 ounce (oz.)  
16 ounces equal 1 pound (lb.) or 7,000 grains  
100 pounds equal 1 hundredweight (cwt.)  
20 cwt. equal 1 ton

APOTHECARIES WEIGHT:

20 grains equal 1 scruple  
3 scruples equal 1 drachm or 60 grains  
8 drachms equal 1 ounce or 480 grains  
12 ounces equal 1 pound or 5,760 grains

FLUID MEASURE:

60 minims equal 1 fluid drachm  
8 fluid drachms equal 1 fluid ounce or 480 minims  
16 fluid ounces equal 1 pint (O) (pt.) (ocatrius)  
2 pints equal 1 quart (qt.)  
4 quarts equal 1 gallon (C) (Cong.) (Congius)

METRIC WEIGHTS AND MEASURES:

The unit of length of the metric system is the meter, which represents one forty-millionth of the earth's circumference (actually 39.37 inches.) One decimeter, which is one tenth of a meter, when cubed is called a cubic decimeter; the cubic decimeter is sometimes referred to as a "Liter Box". It holds exactly 1 Liter, the unit of volume in the metric system. One liter of distilled water at its maximum density (4°C) weighs 1 kilogram, the unit of weight in the metric system. Druggists usually refer to the Gm. as the unit weight in the metric system. One cubic centimeter of water weighs one gram; 1000 cc of water is called a Liter and weighs 1000 grams or one Kilogram.

METRIC WEIGHTS:

.001 means 1 milligram (mg.) (1/1000 of a gram)  
.01 means 1 centigram (cg.) (1/100 of a gram or 10 mg.)  
.1 means 1 decigram (dg.) (1/10 of a gram or 100 mg.)  
1.0 means 1 Gram (Gm.)  
10. means 1 Dekagram (Dg.) or 10 grams.  
100. means 1 Hektogram (Hg.) or 100 grams.  
1000. means 1 Kilogram (Kg.) or 1000 grams.  
10000. means 1 Myriagram (Mg.) or 10,000 grams.

The order of the above series from Myriagrams to milligrams may be remembered by saying "Many Kind Hearts Do Good Deeds Christmas Morning."





1512

A REVIEW ON THE  
COMPOUNDING, STORING AND DISPENSING OF MEDICATIONS  
FOR  
COAST GUARD AND MERCHANT MARINE PHARMACIST MATES  
.....

Chief Pharmacist George F. Archambault, Ph. G Ph. C  
United States Marine Hospital, Boston, Mass.

Revised May 17, 1944

LECTURE II:

1. Pharmaceutical Mathematics:

- A. Make certain that you understand your weights and measures, both English and Metric. You will meet physicians who will use one or the other system. The task of converting to the weights and measures available is yours and not the doctor's.

A handy "conversion bridge" is here presented. Memorize the factors. Use the factor nearest the value you have. This keeps the factor error at a minimum.

CONVERSION CHART

1 gr. equals .065 Gm. or 65 mgm.	1 av. oz. equals 28.35 Gm.
1 Gm. equals 15.432 gr.	1 ap. oz. equals 31.10 Gm.
1 cc equals 16.23 m.	1 pt. equals 473 cc.
1 fl. oz. " 29.57 cc	1 av. lb. equals 454 Gm.
1 fl. drachm " 3.7 cc	480 m equals 454.6 gr (Water)
1 minim equals .95 gr. water	

- B. There is only one unit that affords a "conversion bridge" between the apothecary and avoirdupois weights - the grain. A grain in any system is always the same value as in any other system.

ILLUSTRATION:

Ounces:

Avoirdupois ounce	437.5 grains
Fl. ounce of water at 25°C	454.6 grains
Apothecary ounce	480 grains

Pounds:

Apothecary pound	5760 grains
Avoirdupois pound	7000 grains

Practical Application: Containers of drugs and chemicals coming on board ship are packed according to the avoirdupois system. As pharmacist, you must dispense from these packages according to apothecary system. To do otherwise will defeat the intention of the physician.





H2

C. Review Ratio and Proportion: There is no mathematical process of more value to the pharmacist. The main features of the system are:

1. The Rule: The product of the extremes is equal to the products of the means, therefore, if one of the extremes is missing it may easily be located by dividing the product of the means by the known extreme.

Such problems can quickly be checked for accuracy by comparing the products of the extremes with the product of the means. Sums must be equal.

A fool-proof method of setting up the proportion equation is:

1. Always place X in the fourth place.
2. Place the same kind of a value as X in the third place.
3. Determine whether the answer is to be more or less than the value placed in the third place. If it is to be more, the larger of the two remaining numbers will go in the second place. If it is to be smaller, the lesser of the two remaining numbers will go into the second place.
4. The remaining number will enter the first place.

D. Practical Rules for Specific Gravity Problems:

1. To find the weight where the S. G. and the volume is known, merely multiply the weight of an equal volume of water (in Gms. or Grs.) by the S. G. (Weight of a fluid ounce of water is 454.6 gr.)
2. To find the volume, where the S. G. and the weight is known, merely divide the volume of an equal weight of water (in minims or cc) by the specific gravity. (480 m equals 454.6 gr. water - 100 cc equals 100 Gm water.)

E. Percentage Solutions:

Percentage solutions will usually be wanted as weight to volume percentage solutions.

1. A handy rule is as follows where the prescription is in the English system:  
4.5 times the desired percent expressed as a whole number (if 1% or more) times the desired number of ounces equals the number of grains to be dissolved in enough water to make the desired number of ounces.

(The 4.5 is the number of grains required to make a one fluid ounce one percent solution according to the U.S.P. XII.) (When solute is liquid, substitute 4.8 for the 4.5. Answer is the number of minims to use.)

2. If the prescription is in the Metric system, merely multiply the desired volume in cc by the percent and dissolve the amount of Gms. of the solute so obtained in enough water to make the desired number of cc. (Note:- Not dissolved in the required volume.)



F. Stock Solutions:

This is an important phase of a pharmacist's work. These solutions are called for where the hospital, ship or base wish to carry a concentrated solution which can easily be diluted to a useable strength when needed.

Examples will best illustrate the method:

1. Prepare a 1:4000 solution of bichloride of mercury, four ounces.

1:4000 means 1 Gm. in every 4000 cc.

30 cc. is the factor for a fluid ounce.

Four ounces therefore is 120 cc.

If 4000 cc contain 1 Gm.

then 120 cc will contain X Gms.

Ratio and Proportion:

4000:120::1:X

4000 X equals 120 Gm

X equals .03 Gm (or 30 mgn)

2. Prepare four ounces of a bichloride of mercury solution of such strength that 4 cc diluted to a pint will make a 1:4000 solution.

This is the typical type where space saving solutions are wanted. Try to visualize your problem: 4 cc are removed from the concentrated solution and diluted to a pint, the pint is the 1:4000 solution.

Answer:

1:4000 means there is 1 Gm. in 4000 cc.

If 4000 cc contain 1 Gm

Then 473 cc (1 pt) contain x Gm.

4000:473::1:X

4000X equals 473

X equals .118 Gm or 118 mgn. in 1 pt. of the dilute solution

or 4 cc of the concentrated solution (the 4 ounces.)

Four ounces equals 120 cc.

4 cc contains .118 Gm.

120 cc contains X Gm

4:120:: .118 : X

X equals 3.54 Gm. to be dissolved in enough water to make 120 cc of the concentrated solution.

G. ENLARGING AND REDUCING FORMULAS:

You will be called upon to make a certain amount of an ointment or a solution. The formula may be for more or less than the desired amount. Use ration and proportion. This is the simplest method of determining the correct amounts. (See problem XI on work sheet.)





H. Conversion of Heat Degrees:

United States Public Health Service Bases have adopted the metric system. Many physicians called from civilian life have for years used the Fahrenheit system of heat units in checking temperatures. You may be called upon to convert from one system to another. Follow these two simple rules:

C. to F. To the C. degree - add 40, then multiply by 1.8 and subtract 40.

F. to C. To the F. degree - add 40, then divide by 1.8 and subtract 40.

1. Aliquot Parts:

A pharmacist is sometimes called upon to prepare a solution or a solid preparation of a chemical which is not capable of being weighed. In such cases he resorts to aliquot parts.

EXAMPLE:

Rx Atropine sulphate 1/100 gr.  
M. ft. t.t.  
Fiat tales doses #10

Note that the total weight required is 1/10 gr. Many balances cannot weigh accurately under 1 gr.

Also note that the prescription is in the English system. On board ship and at U.S.M.H. stations will usually be found only metric weights and measures.

1 gr. is 65 mgm., therefore, 1/10 gr. is 6.5 mgm. and cannot be accurately weighed.

RULE:

Weigh an amount that is an exact multiple of the amount desired. Dilute this multiple to a weight which when divided by the multiple factor will give a weighable amount.

Weigh out 130 mgm (2 grains) which is a weighable amount. This is exactly 20 times too much. Dilute the 130 mgm with enough inert substance such as sugar of milk to build the weight to an amount exactly divisible by 20. (the multiple factor.)

.130 atropine sulphate (2 grs) (20 times too much).

1.870 sugar of milk  
20 12.000 total weight

.1 Gm. - this 100 mgm. contains exactly  
1/10 gr. of atropine sulphate.

The same principle applies to solutions, usually water is used as the diluent.

A practice set of problems is presented, covering the mathematics discussed.

Feel free to ask the pharmacist how to tackle any problem that you cannot solve.





16

1. How many 10 gr. pills can be made from a one pound package of quinine sulphate?
2. How many drachms of aspirin are left in a one ounce package after 2 drachms are dispensed from it?
3. A cough syrup calls for 3 drachms of ammonium chloride in each 4 fluid ounces. How many avoirdupois ounces would be contained in 5 gallons of syrup?
4. If argyrol costs \$1.50 per ounce, what is the cost of 3 drachms?
5. Convert 250 cc. to ounces.
6. If 1 Gm. of boric acid is soluble in 18 cc of water, how many grams will dissolve in 1 pt. of water?
7. If 2 fluid drachms call for 3.5 gr. of a chemical, how many grams in 50 cc. of the solution?
8. Change 72 degrees F. to C.  
Change 40 degrees C to F.
9. A prescription has a volume of 1 pt. and contains 3 gr. of strychnine sulphate. How much strychnine sulphate in each dessertspoonful?
10. A prescription has a volume of 8 fluid ounces and contains 6 fluid drachms of tincture of nux vomica. If the directions call for 2 teaspoonfuls to be taken after each meal, what is the total quantity of the tincture taken each day?
11. Camphor 5. Zn O 20. Starch 70.  
How much of each ingredient should be used to make 8 apothecary ounces of the above? To make 500 gms?
12. What is the weight of 450 cc. of glycerin having a specific gravity of 1.25? What is the weight of 240 minims of castor oil, specific gravity of .958?
13. What is the cost of 50 lbs. of glycerin, specific gravity of 1.25, bought at \$.54 per quart?
14. How much potassium permanganate is necessary to make two liters of a 1:5000 solution?
15. How much mercuric chloride in 6 fluid ounces of a solution such that one drachm diluted to a quart equals a 1:10,000 solution?
16. How much 1:4000 solution can be made from 1 ounce of mercuric chloride?
17. How much boric acid is there in 1 gallon of a 4% solution?
18. How much atropine sulphate is there in 50 cc of a 1/50% solution?
19. How much mild silver protein is necessary to make 3 fl. drachms of a 10% solution?



~~22~~

20. How much silver nitrate is necessary to make 4 fl. ounces of a 2% solution?
21. How much 2% solution can be made from 1/8 ounce of cocaine hydrochloride?
22. How much water should be mixed with 95% by volume alcohol to make 5 gallons of 70% by volume alcohol? (Use proportion.)
23. How much boric acid is necessary to make 4 ounces of a 2.5% solution?





A REVIEW ON THE  
COMPOUNDING, STORING AND DISPENSING OF MEDICATIONS  
FOR  
COAST GUARD AND MERCHANT MARINE PHARMACIST MATES  
.....

*21*

Chief Pharmacist George F. Archambault, Ph G. Ph C.  
United States Marine Hospital, Boston, Mass.

Revised May 17, 1944

Lecture III:

1. Table of Household Factors

<u>Household Factor:</u>	<u>ENGLISH EQUIVALENT*</u>	<u>METRIC EQUIVALENT*</u>
Drop	minim	
Teaspoonful	1 fluid drachm	4 cc
Dessertspoonful	2 fluid drachms	8 cc
Tablespoonful	4 fluid drachms	15 cc
Wineglassful	2 fluid ounces	60 cc
Teacupful	4 fluid ounces	120 cc
Tumblerful	8 fluid ounces	240 cc

\*Approximate

2. The Function of Certain Drugs Used in the Genito-urinary System

The acid base equilibrium of urine may be changed by drugs.

- A. In the treatment of cystitis (inflammation of the bladder) it is necessary that the urine be brought to the basic side. This renders it less irritating. Saline drugs are used.

Examples:- Potassium Acetate  
Sodium Citrate  
Sodium Bicarbonate

- B. In the treatment of pyelitis or where diuresis is desired the urine is made acid in character.

1. To increase diuresis (excessive flow of urine) ammonium chloride is used.
2. To discourage bacterial growth in pyelitis (inflammation of pelvis of kidney) ammonium mandelate is used.
3. In the treatment of pyelitis, methenamine is given with sodium biphosphate. The sodium biphosphate acts as a urinary acidulant and brings the pH. of the urine below 5.5. The methenamine is hydrolyzed into ammonia and formaldehyde.





COMMON LATIN ABBREVIATIONS

<u>Abbreviation</u>	<u>Latin</u>	<u>English</u>
aa	ana	of each
A.C.	Ante Cibum	Before meals
B.I.D.	Bis in die	twice a day
Cap.	Capiat	Let the patient take
Caps.	Capsule	Capsule
Chart.	Charta	Paper (powder)
Coch. Parv.	Cochleare Parvum	teaspoonful
Colly.	Collyrium	eye wash
Cong.	Congius	gallon
E.M.P	Ex modo praescripto	As directed
Ft.	fiat	make
Gtt.	guttae	drop
H.D.	Hora decubitus	At the hour of going to bed
H.S.	Hora Somni	at bed time
M.	Misce	Mix
O.	Octarius	pint
O. D.	oculus dexter	right eye
O. L.	oculus laevus	left eye
O. S	oculus sinister	left eye
O. U.	oculuc uterque	both or each eye
P. O.	per os	by mouth
P. C.	post cibis	after meals
Stat.	statim	at once
P. R. N.	pro re nata	as needed
Q. S.	Quantum sufficiat	as much as needed
ss	semis	one-half
S. V. R.	Spiritus Vini Rectificatus	alcohol
T. I. D.	ter in die	3 times a day
Ut. Dict.	ut dictum	as directed



A.	Absence of; lack of; without; not
adeno	gland
aemia	blood (also <del>emia</del> , haemia, homia)
algia	pain
an	same as A. Consonant is added for the sake of sound before a vowel as: an /emia.
andro	man; pertaining to male
angio	pertaining to blood or lymph vessels.
anthropos	man; pertaining to male
arthro	joint of bone
atrophy	a waste of; a diminution of a part
auris	ear
auricular	pertaining to the ear
auditory	pertaining to the ear
bronchus-chi	bronchial tubes
caput	head or head-like structure
carci	pertaining to cancer
cephalic	pertaining to the head
cervix-cal	neck; also the neck or narrow part of an organ
coccus-cocci	bacteria cells
cranium	head
chole	gall bladder
colpo	vagina
cyesis	pregnancy
cystic	bladder (urinary) (gall)
cyte-cytos	cell
dentis	teeth
derm	skin
dis-dys	painful-difficult
ecto	without, or on outside of
-ectomy	cutting of
en	in
emia	blood
encephalos	brain
endo-en	inside-within
entero	intestines
epi	upon-beside; among; above; over
epithelium	skin (outside covering)
erythro-erysi	red
erythema	redness
eso	inward
ex	out; outwards
exo	outside
fauces	passage from mouth to pharynx
gastrium	stomach
gastro	pertaining to stomach
gastric	pertaining to stomach





glosso	tongue
gonad	sexual gland
gyneco-gyne	woman; pertaining to female
haenia	blood
hepato-tic	liver; pertaining to liver
hyper	above; high
hypo	below; under
hystero	uterus; womb
infra	beneath
intra	within
-itis	inflammation
laparo	loins, in connection with abdominal wall
larynx	throat
leuco	white, colorless
lingua	tongue
lingual	pertaining to the tongue
-logy	knowledge or science of
mal	bad; wrong; false
masto-mast	breast; especially the female breast
media	middle; halfway
mening-o	membrane of brain; or in connection with membrane
meno	menses; menstruation
meso	middle of
meta	change, after or next
metro-metra	uterus (womb)
myel	marrow
myo	muscle
nephro	kidney
nephritic	pertaining to the kidney
neuro	nerve
occiput	head (back part)
odonto	teeth (also dentis)
-odyne	pain
oma	tumor
opthalmo	eye
oral	mouth
orchic	testicles
-osis	abnormal condition - process
oto	ear (also auris, auricular, auditory)
parous	giving birth to, producing
pathos	disease
pedia	children
pella	skin
penia	poverty of
peri	around outside
phagos	to eat; engulf





22

phallus	penis
pharynx	passage between esophagus and larynx
phlebo	vein
pleura	lung membrane
podos-poda	foot
poly	many
polio	gray; grey matter (of brain - spinal cord)
procto	anus
prosopo	face
pseudo	false
psycho	mind
pus	pus
-rhagia	sudden discharge - sudden flow
-rhea	discharge
salpingo	tube
sarco	flesh
sect	to cut, usually with "re"
sepsis	poisoning, through putrescent material or organisms in blood
stoma	mouth (opening)
sub	under; below
supra	over; above; beyond; more than
thela	nipple
-toma	cutting instrument
-tomy	the operation of cutting
tonic	normalize or normal
trans	across; over; beyond
tropho	nourishment or nutrition
vascular	pertaining to vessels of the body

practice medical word building with the above chart

Example 1: Oto means ear, scope - something through which one observes or looks - therefore otoscope - ear examining instrument.

2: Logy means knowledge, cardio means heart. Cardiology must mean knowledge of the heart.

3: Card (ium) means heart; peri - outside of; itis, inflammation. Pericarditis - inflammation of the outside of the heart.



DIAGNOSES AND TREATMENT ABOARD SHIP BY PHARMACIST MATES

E. C. Jenkins, P. A. Surgeon

.....

In so-called "normal times", it would be against all the accepted principles of medical ethics to be teaching Pharmacist's Mates diagnoses and treatments. However, these are not normal times - we are at war, and a goodly number of you will be on board a ship and will be expected to carry on alone the duties of a ship's doctor. With this in mind, I believe we are justified in attempting to teach you a minimum about those conditions which may plague your shipmates at sea.

The first thing to consider in treating patients is that one is not treating guinea pigs, but an individual with a mind. In every kind of illness, you must treat worry along with the physical symptoms. A certain percentage of every symptom complex is due to worry and the remainder to physical malfunction. You must treat the individual as a whole - both mind and body.

To treat the worry (functional complaints), you must gain the patient's confidence. To gain this, it is necessary to be sympathetic, reassuring (tell him he is going to make an uneventful recovery), and be a good listener. Ask every patient about the well being of his father, mother, girl friend and the remainder of his family. These seamen will want to tell their troubles to someone, and if you let it be you, you will have gained their confidence. Just as in the case with a customer - "the patient always is right". If he states that he has pain in one hair of his head, as far as you are concerned, he has it. Never engage in an argument with any patient, and do your utmost to refrain from inviting criticism. Remember, over 90% of the seamen reporting to Sick Bay would recover without any treatment whatsoever. You are more than 90% right before you begin.





Usually the more you prescribe for a patient, the more he believes is being done for him and the better satisfied he is. Use hot water bottles, liniments and massage freely (if only for psychic therapy). Give two glasses of water with every dose of medicine. The water usually does more good than the medicine.

Patients report to Sick Bay not for a diagnosis, but for the relief of pain or some other symptom. Let the relief of symptoms be your first task, and the diagnosis of the disease be the second consideration. If the patient has pain, relieve it with aspirin, codeine or morphine, depending on the severity. If the patient has something worrying him, let him tell you about it as often as he desires. After he has repeated his worries frequently enough, he will be desensitized to them and they will cease to be worries.

It has been a sound medical dictum in the past: "Let a functional diagnosis be the last diagnosis considered". At sea, affairs are decidedly different and you will not be expected to make any astounding diagnoses, but you will be expected to bring as many men as possible back to port alive and with good morale. To do this, you will have to consider every seaman to have a nervous system that functions fairly well under average civilian stress and strain. Every nervous system aboard ship is placed under much greater stress and strain as soon as the ship leaves the dock. The excitable, nervous individuals with the hair-trigger, sympathetic, nervous systems will be coming to Sick Bay complaining of headache, stomach ache, gas on their stomach, smothering sensations in the throat, fluttering heart, pain in the chest, pain over the stomach, pain in both lower quadrants, diarrhea and even vomiting. An over-active nervous system can give a patient symptoms of disease in any organ in the body. Let the physicians in the Marine Hospitals worry about the diagnoses.





You treat symptoms. Give these patients 1/2 grain of phenobarbital and 10 minims of belladonna three times a day and 1 1/2 grains of phenobarbital at bedtime. Do not take the patient off duty, as this will make his symptoms worse. Be firm but kind.

It is well to remember a few generalities in carrying out the duties of a pharmacist's mate aboard ship. If you do not know what is causing a patient trouble, do not do anything except place the patient in bed, force fluids, and relieve his pain. Most patients will come to you because they have pain. Do not spend a week trying to diagnose illness before you relieve pain. Give something immediately for pain and, usually, before you can make a diagnosis, the patient will have recovered. In any emergency, remain calm. If the patient is going to expire quickly, there is usually nothing you can do to save him. Your job during battle will consist of controlling hemorrhage, keeping patients warm, and administering adequate doses of morphine. Keep fingers, instruments and antiseptics away from wounds. Apply sterile dressings and splints when possible. Remember, antiseptics usually do no good and may do real harm.

A patient with a common cold usually complains of a nasal discharge, sore throat, cough and muscular pains of the back and extremities. It has not yet been proven what the causative organism is in common cold, but it probably invades through the nose. Since the focus of infection is in the nasal mucous membranes, it is mandatory that treatment should be begun and continued at that site. Two per cent. ephedrine in saline nose drops used four times per day has proven to be of benefit. Sore throat improves rapidly if aspergun is chewed. Hot saline gargles also are highly recommended. A patient coughs because the mucous membranes of the bronchi are irritated. Excessive coughing increases the irritation of the bronchial mucous membranes. It is recommended that if the cough is "tight", some medicant such as Brown Mixture or Stokes Mixture be prescribed to "loosen up" the cough. If the cough is "loose", a cough mixture such as terpin hydrate and codeine is recommended to "tighten up" the



cough. If the patient is suffering from severe paroxysms of coughing which prevent sleep, it is probably well to break into the vicious cycle by administering one grain of codeine every four hours. Codeine is said to depress the cough center and thus decrease the severity and frequency of the cough. Whether or not acidosis exists in common cold has not been definitely established. It has been a clinical tradition that the muscular pains of common cold are caused by acidosis and that alkalization with fruit juices or soda bicarbonate is efficacious in reducing the duration of symptoms. It is recommended that you prescribe one teaspoonful (60 grains) of soda bicarbonate and 10 grains of aspirin with two glasses of water or fruit juice four times per day in the treatment of common cold. If the patient does not respond favorably to treatment while remaining ambulant, recommend bed-rest.

At times, you will not know whether the patient has a severe cold or pneumonia. In pneumonia, the patient appears much more ill and usually has had a chill. The temperature will be high (103°F-105°F.), the respirations will be fast, the wings of the nose will be flaring with each respiration, and the patient will be coughing up mucoid or rusty sputum. There may be pain in the chest on the side of the pneumonia. If you are quite certain the patient has pneumonia, absolute bed-rest with sulfonamide therapy is mandatory. Prescribe four grams of sulfadiazine stat. and one gram every four hours until the temperature has remained normal for three days. It is very necessary that the fluid intake be maintained at 4000 cc. per day. Control the cough and chest pain with adequate doses of codeine. Admit the patient to a hospital on reaching port.

If you do not keep your ship sanitary, your crew hygienic, and your galley clean, there will be epidemics of diarrhea. Several members of the crew will report to Sick Bay complaining of lower abdominal cramps, vomiting and





27

diarrhea (several watery bowel movements per day). Usually by the time the patient presents himself, all of the offending material has been removed from the intestinal tract by the numerous bowel movements. The bowel is irritated and needs rest. Medicants which will terminate the frequent bowel movements and form a soothing coat over the irritated bowel-lining are in order. It is recommended that you prescribe three teaspoonfuls of paregoric and 20 grains of bismuth subcarbonate four times a day until the diarrhea is terminated. Inspect the food, galley and messmen. Report your findings to the Captain. If a case of diarrhea presents high temperature, pus or blood in the stool, sulfonamide therapy is probably indicated. Prescribe 60 grains of sulfathiazole stat. and 15 grains four times per day. Treat dehydration by forcing liquids by mouth and administering infusions.

The publicity which one pharmacist's mate received for attempting an alleged appendectomy at sea is unfortunate. It is difficult to predict how many innocent persons' lives will be placed in jeopardy by this incident. You can only be warned that if you should attempt such a ridiculous procedure, you probably will sacrifice a shipmate's life for an infinitesimal amount of notoriety and publicity. It is well to remember that if the patient succumbs, it is going to be rather difficult for you to live with yourself the remainder of your life. Most well-trained surgeons hesitate to operate at sea. They realize the pitfalls. "Only fools rush in where angels fear to tread". There is a non-surgical treatment of appendicitis, and very few patients will not recover if you administer it.

In appendicitis, the patient usually first experiences pain about the navel, which pain later moves to the right lower quadrant. Shortly after the patient is aware of the pain, he usually becomes nauseated and may vomit. When one places



his hand on the abdomen, there is tenderness half-way between the navel and the most prominent point of the hip bone. If you suspect a patient has appendicitis, order absolute bed-rest in a semi-sitting position, with a sea bag or pillow under his knees. The purpose of this position is to render the right lower quadrant the lowest part of the body. Place an ice bag over the appendiceal area and allow nothing by mouth except liquids. If there is severe vomiting, administer saline intravenously. Maintain fluid intake at 3000 cc. per day. After 24 hours' observation, if the pain is more severe and the tenderness more pronounced, administer sulfadiazine four grams stat. and one gram four times per day until improvement is imminent. Never prescribe any kind of a cathartic for abdominal pain.

Athletes Foot is a common ailment of sailors. The causative organism cannot live without moisture and this is why it attacks between the toes. It is well to caution your crew to dry well and sprinkle powder between their toes when they take a bath. If the toes and feet are acutely inflamed, you will have to place the patient in bed, elevate the feet on a pillow or sea bag, and apply hot permanganate packs to the feet for one hour, three times per day. When the acute inflammation subsides, then you are ready to treat the condition as you would any chronic case with the cracks between the toes and abundant dead skin. About the only concoction you have on board ship with which to treat a chronic condition is half strength Whitfields Ointment. Place this on cotton between the toes once per day. Never use full strength because it will usually make the condition worse. If you do not have Whitfields Ointment, paint between the toes with Metaphen or Merthiolate and place cotton soaked in alcohol between the toes.

It is necessary sometimes to remove foreign bodies from the ears and eyes. If a foreign body is in the ear, place the head on a table, with the





opposite ear down, fill the ear with mineral oil, and float the foreign body out. If this does not meet with success, do not probe in the ear with an instrument. Leave the foreign body in place until you reach port. If the foreign body is in the eye, first procure good light, then seat the patient. Take your position behind the patient. With a fine cotton swab, turn the upper lid back on itself and have the patient look in all directions. When the object is detected, wipe it gently away. Place ophthalmic ointment in the eye and cover it with cotton and bandage for 24 hours. If the foreign body is deeply imbedded, do not attempt to remove it. Instil ophthalmic ointment in the eye and cover it until you reach port.

The foregoing are but a few of the problems which will perplex you when you are under way. When you do not know what to do, do not do anything radical. Minor surgery is surgery that becomes more major, the more minor the surgeon. Do not attempt to be scientific. Use average judgment and your troubles will be minimum.



TECHNIQUE FOR SCRUBBING AND SETTING UP OPERATING ROOM

Miss Lula Bond

April 20, 1943

Each one of the operating room personnel removes his outer clothes, puts on his operating clothes, and then proceeds to the scrub-up room.

1. Wash hands and arms with soap and running water.
2. Clean finger nails. (Nails should be kept cut short).
3. Scrub hands and forearms as far as the elbow for 5 minutes with brush, soap and running warm water, change brushes and scrub again for five minutes.
4. Rinse soap from hands and arms in such a manner that the water from the arms does not run to the hands.
5. Rinse hands and arms in 70% alcohol.
6. The clean, bare (as well as gloved) hands should always be carried above hip level and should not be allowed to hang down at the sides.
7. The initial scrub-up should require 10 minutes. Subsequent scrub-ups should be from 3 to 5 minutes, if the gown and gloves have been left on until time to scrub again. Be sure all caked powder is removed in the scrubbing before going through the alcohol.

When the scrub nurse has finished scrubbing she puts on a sterile gown and gloves, being careful not to touch the outside of gown or gloves with bare hands. She then drapes her table, mayo stand, and spinal table with sterile sheets, towels, and mayo cover. The tray of sterile instruments is brought in and opened by the circulating nurse and the sterile nurse arranges them in the proper order on the table and mayo stand. All sterile tables and stands are covered until they are to be used. If there is any delay or waiting the hands of each person scrubbed should be covered with a sterile towel until time to start the operation.

The patient is brought in and put on the operating table and the anesthetic is given. The abdomen is scrubbed again with ether to remove grease and moisture, and then painted thoroughly with the antiseptic to be used, allowing each coat to dry before the next one is applied. Then the patient is draped with towels and a laparotomy sheet.

The skin knife is always discarded as soon as the incision is made.

The operator and his assistants, MUST NOT at any time during the operation touch anything outside the sterile field.





### Proper Method of Glove Sterilization.

After an operation, rinse off gloves in cold water before removing them. Soak for five minutes in lukewarm water with a little green soap added. Rinse thoroughly to remove all soap. Dry thoroughly by hanging them up to dry or by rubbing them between towels. When dry test for leaks and holes. Use good gloves, not patched ones, for major surgery if possible. Patched gloves may be used for minor surgery or for examinations. Powder gloves inside and out, turn down cuff and place a powder puff or folded sponge inside each glove to insure free passage of heat inside the glove. Wrap a pair, right and left, together and autoclave, standing on edge, for twenty minutes at 250 degrees F. Before removing gloves from autoclave door should be opened only a crack and left so for about five minutes to allow the packs to dry.

### Gloves May Be Boiled.

For Boiling. - Prepare gloves the same as above, leaving out the puffs or gauze. Wrap in a towel and pin so they won't drop out in removing them from the sterilizer. Boil for twenty minutes.

Water must be boiling when gloves are put in. Gloves should be boiled separate from instruments and not in contact with metal. Dry well before using.

Don't sterilize gloves too long.

Don't sterilize gloves in direct contact with metals. This can destroy life of rubber.

Don't inflate gloves while wet.

Avoid mineral oil, other oils and vasoline. Natural rubber is destroyed by such materials.

### Cleaning the sterilization of rubber tubing.

#### To Treat New Tubing.

Wash New tubing thoroughly with soap and water after rinsing well the tubing is boiled for thirty minutes or more in 2% sodium carbonate solution or 1% solution of sodium hydroxide. Fill lumen of tubing with the solution by means of a syringe. Place tubing in pan large enough so that solution covers all of tubing and autoclave for twenty minutes, as you do solutions. Remove from autoclave and connect to cold water faucet and run cold water through tubing for one hour. Drain tubing thoroughly and dry before putting away in a cool place.

#### To Clean Intravenous and Transfusion Tubing.

Wash with plain water then rinse with fresh sterile distilled water and then with sterile saline using a syringe. Do not drain off all water in tubing so that in autoclaving, water may turn to steam and sterilize inside of tubing. Always examine tubing for holes or soft spots. Replace tubing if life is gone from the rubber. Autoclave for twenty minutes at 250 degrees F.



## Scrubbing -2-

To Clean and Sterilize Syringes and Needles:

Wash thoroughly in soap and water, rinse with alcohol and then with ether. Examine points to see that they are sharp and also note whether stilets fit or not. Polish outside if dull or sticky from adhesive tape. When packing any needles for autoclaving, see that all points are protected, especially in spinal or local sets. Remove the plunger from the barrel and wrap together in a piece of gauze and then in muslin, double thickness wrapped. A hypo needle may be wrapped with each syringe. Autoclave for thirty minutes at 250 degrees F.

To Make and Sterilize Normal Saline Solution.

To 1000 cc of distilled water add eight saline tablets and then autoclave for twenty minutes at 250 degrees F. At the end of the twenty minutes turn off the steam and leave the door closed until the steam pressure drops to zero. NOT TO BE GIVEN INTRAVENOUSLY.

To Sterilize Hand Brushes: 1. Rinse free of soap. 2 - Immerse in 70% alcohol for 1 minute. Soak the brushes in a solution of Iodine 1000 cc of distilled water and 10 cc tincture of iodine for twelve to 18 hours. The brushes can be removed with a sterile forcep and wrapped in a sterile towel for use.

Care and Sterilization of Linens.

All linens must be tested for holes before being folded and wrapped for sterilizing. Each article should be folded loosely and wrapped in double thickness wrapped, large enough for the article to be wrapped and tied securely.

Since packages do not breathe, it is not necessary to re-autoclave them, if they are properly wrapped, sterilized and kept stored in a clean place. However, packages should be dated and the oldest ones should be used first. Try to prevent keeping sterile packages more than 14 days before they are used.

When loading the autoclave, bear in mind that all movements of air and steam within the chamber are from the top toward the bottom a simple matter of gravity, since air is more than twice heavier than steam. If packages are placed flat side down they will present the greatest resistance to this downward movement of air and steam, but if the packages are lying on edge, air and steam will circulate with little resistance between the layers of fabric. Avoid crowding packages into the autoclave and keep packages away from door, at least two inches.

Materials, linens, etc., should be sterilized for thirty minutes at 250 degrees Fahrenheit. Before removing packages from the autoclave, door should be opened only a crack and packages left in the sterilizer for about one hour to allow packs to dry. Leave the steam on while drying.





Technique for Cleaning Up Following Septic Cases.  
( Abscesses, Infected Hands, Pus Appendix, etc.)

Keep used linen, sponges, etc., off the floor if possible. Before the scrub nurse removes her gloves she should put all the soiled linen in a clean bag of heavy material. She should not touch the outside of the bag. The bag should be closed by the circulating nurse, labeled contaminated, and sent to the laundry separately from the other linen. The bag should be washed with the linen. The scrub nurse should open all the instruments and put them in a basin large enough so the instruments can be covered with a 2% sodium carbonate solution or 10% solution of green soap and autoclaved for twenty minutes at 250 degrees Fahrenheit. Basins, trays, etc. should be autoclaved too but not in the basin with the instruments. Gloves should be rinsed in a pan of plain water and left in the same basin and autoclaved for twenty minutes at 250 degrees Fahrenheit. These should be taken off same as solutions by turning off steam and leaving the door closed until the steam comes down.

The furniture should be gone over with a 10% solution of lysol USE GLOVES FOR THIS. The lysol will brun the hands. The floor should be mopped with a stronger solution of lysol and the Sponge buckets soaked in a lysol solution. The soiled sponges are put in a strong paper bag and burned.

Patient.

The field of operation must be washed with soap and water and then shaved. Then scrub the area with ether. This should be done before the patient is brought to the operating room. If a spinal anesthetic is being used, after it is given or after the patient is asleep, the sheet is folded down across the top of the thighs and the operative field is again washed off with ether and then painted with an antiseptic. (Iodine in strengths varying from 3 to 7 percent followed with alcohol 70 to 95 percent. Merthiolate, Mercresin, Metaphen, Zephiran, Mercurochrome, etc)

Allow each count to dry before calling the second.



Local Set

2-10 cc syringes  
 1-medicine glass  
 1-short hypo needle  
 2-long hypo needles

Wrapped together and  
 autoclaved for thirty  
 minutes at 250 degrees F.

Basins

1-Large basin for alcohol  
 (FOR HANDS)  
 1-basin for paint  
 1-basin for wet sponges  
 or sutures

To be wrapped separate and  
 autoclaved for thirty  
 minutes at 250 degrees F.

INSTRUMENTS

4-sponge forceps  
 8-towel clamps  
 2-Behsner forceps  
 2- Allis forceps  
 2-Babcock forceps  
 2-needle holders  
 15 hemostatic forceps  
 1-tissue forcep with teeth  
 1-tissue forcep without teeth  
 2-Parker retractors  
 2-U S Retractors  
 Any other deep retractor you might  
 have on hand.

Open all instruments before they  
 are sterilized. Autoclave for  
 twenty minutes at 250 degrees F.  
 or boil for twenty minutes in a  
 sterilizer or covered basin  
 large enough to allow the instru-  
 ments to be completely covered  
 with water.

Linen and Gloves

1-Gown for each person scrubbed  
 1-pair of gloves for each person  
 scrubbed.  
 1-plain sheet for instrument table  
 1-Mayo cover or two pillow slips for  
 Mayo stand  
 12-towels  
 48 4x4 sponges  
 4- lap or tape sponges  
 1-lap sheet or 4 plain sheets for  
 draping the patient

Spinal Set

2-prop pads  
 1-2 cc syringe  
 1-5 cc syringe  
 1-hypo needle  
 1-20 gauge hypo needle  
 1-20 gauge hypo needle  
 1-medicine glass  
 1-spinal needle

Wrapped together and  
 autoclaved for thirty  
 minutes at 250 degrees F.

Sutures.

Plain 0 catgut for ties,  
 3 tubes.  
 Plain 2 catgut for the  
 Appendix or chromic 1,  
 1 tube  
 Plain 2 for the Peritoneum  
 1 tube  
 Plain 0 for the muscle  
 1 tube  
 Chromic 1 for the fascic  
 1 tube  
 Kell-Dermic or silk for the  
 skin

If sutures are boilable  
 they may be sterilized  
 with the instruments,  
 If sutures are non-boilable  
 they may be soaked in B. P. or  
 Formaldehyde Germicide for  
 18 hours.

Scissors and suture needles.

1-pair of dissecting scissors  
 1-pair of suture scissors  
 3-curved noncutting needles.  
 2-cutting needles for the skin.

These may be soaked for 12  
 to 18 hours in a Bard Parker  
 or Formaldehyde Germicide  
 solution.

This solution is very  
 irritating to the tissues  
 and must be removed before  
 using, by rinsing in saline  
 or sterile water and wiping  
 dry.





April 21 1943

## Dressing Cart.

## A. Dressing Cans.

1. Remove covers and either hold in hand touching only outside of cover or place upside down, that is, with edge that goes over can up.
2. Remove contents with sterile pick ups.
3. Remove applicators, tongue blades, vaseline gauze with sterile pickups.
4. Remove alcohol sponges with sterile pick ups.. The alcohol cannot kill bacteria left by unsterile hands. Therefore, this can should be sterilized with the dry 2 x 2 sponges in it, and after sterilization the 70% alcohol added.
5. Ag No sticks. Wipe with alcohol are self sterilizing.
6. Adhesive. It used over open wound to approximate edges. flame before using.
7. Ointments. Remove from can with sterile tongue blade even if ointment is not sterile, to avoid needless contamination. Do not use the tongue blade over if it has been contaminated by the patient's dressing.
8. Do dressings with sterile forceps.  
To protect the patient  
To protect self

## B. Used dressings

1. If from clean case and facilities are available, may be washed, folded and sterilized for re use.
2. If from septic case, wrap in newspaper and burn. Use care and do not contaminate hands.

## C. Order of doing dressings.

1. If same cart is used, do clean cases first, then septic cases.
2. Choose a time for dressings when dust caused by sweeping, etc., is at a minimum, preferably after ward is swept and cleaned and dust circulated in so doing has settled.

## D. Keep hands clean.

1. Cannot overemphasize importance of clean hands and nails. Keep hands out of pus, and if necessary, wear gloves.
2. Wash between dressings and if possible, or rinse in 70% alcohol and allow to dry.



## Preparation of skin for operation:

1. If possible, patient to have bath and be clean.
2. Scrub area to be shaved with soap and water 10 minutes.
3. Shave with sharp razor - removes desquamating epithelium and bacteria as well as hair.
4. Wipe area with alcohol 70%, then ether. (removes soap & grease)
5. Paint with antiseptic sol. this solution varies with different doctors. Allow this to dry on the skin no matter what solution is used.  
Tr. iodine should dry and then be removed with 70% alcohol.  
Tr. merthiolate, metaphen; Tr. Iodine, zepharaïn.
6. Fresh wounds:
  - a1 Before treating and suturing must be cleaned.
  - a2 Scrub skin with mild soap and water
  - a3 Irrigate wound with sterile normal saline.
  - a4 Paint area around wound with antiseptic solution.  
Do not pour in wound

## Care of operating room and air borne infection.

1. Keep walls, furniture, and windows washed and clean. Use dust free cleaners.
2. Keep lights dusted and special attention given to spot lights.
3. Do not allow powder on floor. It may be scuffed up, settle in incision and cause infection.
4. Keep quiet. Germs from nasopharynx of team may be blown through mask and mask only gathers small droplets.
5. Avoid contamination of floors with pus and blood which may dry and be scuffed up.

## scrubbing

Scrub up for operations: -- Antiseptic ~~sterilization~~, covering skin 3x10 times

1. Wash hands and elbows to 2 inches above elbow, clean and trim nails.
2. With sterile brush, scrub hands and arms to 1 inch above elbow with soap and running water for 5 minutes. Scrub hands and nails first and then arms. Do not return to hands after scrubbing arms.
3. Change brushes and scrub hands and arms to elbows for 5 minutes with soap and water.
4. Rinse soap from hands and arms in such a way that water from arms does not run to hands.
5. Rinse soap off thoroughly as soap inhibits action of germicide.
6. Rinse in 70% alcohol - rubbing intensified action.
  - 1 - 1 minute rubbing on skin equals 6 1/2 minutes scrubbing
  - 2 Tr. Zepharin 1:1000 equals 2 minutes scrubbing
  - 3 Limepaste equals 4 minutes rubbing or 20 minutes scrubbing
  - 4 Subsequent scrub up from 3-5 min. Remove all soap and powder before going through alcohol.

## Draping:

1. Gown - (a) Fold inside out in such a way that in putting it on the outside of gown is not touched in any way. Be careful of ties and belt that they do not fall on "dirty" area and then contaminate the sterile gown. Tie gown at neck and waist. Do not pick up belt but bend over so circulating nurse may grasp belt and tie  
(b) Keep hands at waist level.





## 2. Gloves

- a. Inside of gloves only touched by bare hand.
- Outside of gloves only touched by outside of glove.
- b. Dry glove technique.
- c. Wet glove technique.

Boil 20 minutes.

Submerge in sterile water or aqueous germicide 1:5000

Aqueous cepharin or 1:5000

Bichloride of mercury.

#### 4. Guard against puncturing gloves. If punctured or torn, discard as dirty article causing accident i.e. needle forceps.

1. Remove glove keeping fingers of clean hand away from inside of glove. Do not let powder fly - (remove away from sterile field)
2. Test all gloves for holes before powdering. Carelessness in this may cause infections.

#### 3. Draping sterile field (Demonstration)

##### 1. Table

##### 2. Mayo stand

Sterile tray better technique. Moisture does not seep through. If sterile tray not available, cover top and bottom of stand with three thicknesses of muslin and keep wet articles off tray or place on thicknesses of sterile towel.

##### 3. O. R. Table

4. Passing around another member of operations team. Pass back to back - Never turn back on sterile field.

#### 4. Sutures.

1. Boilable catgut - boil, autoclave or soak tubes in germicide.
2. Bow boilable catgut, to be sterilized in cold germicide.
3. Cotton, silk thread - boil or autoclave  $250^{\circ}\text{C}$  for 20 minutes moisten first.

4. Do not break catgut sutures long before they are to be used - are easily contaminated.

##### 5. Opening of sterile packages.

1. Wrap with flaps which may be easily grasped and package opened with least chance of contamination.
- Best to open packages on solid surface

#### 6. Handling of sterile pick ups.

1. Utmost care necessary as top rim of jar is unsterile.
2. Formaldehyde germicide does not get weaker but does get dirty and needs either changing or filtering.

#### 7. Do not oil instruments. If cleaned and dried properly will not rust. Oil does not sterilize readily.

#### 8. I.V. Tubing

Usually comes untreated. Boil 20 minutes in 2% sod. carbonate. Sol. or 1/2% sod hydroxide. Sol. Rinse

1 hour dry and coil (when boiling be sure lumen of tubing is filled with solution) Rinse thoroughly.

Distilled water and saline before sterilizing.

Always sterilize tubing of any kind wet, so the water may flash to steam and the lumen of the tubing will then be sterilized by steam.



9. Pouring solution from bottle.  
If bottle does not have sterile top always pour a little over rim, into sponge pail before pouring into sterile cup.
  7. Formula for formaldehyde germicide.  
Formalin 38% 130 gms  
Potassium Nitrite 0.15 gms.  
Sod. Hydroxide 0.012 gms  
Ethyl alcohol 95% qs 1000 cc.
  10. Use strings for tying packages
    1. Pins make holes
    2. Pin points may stick thru wrapper
    3. String is stronger and easier to use.
  11. Vaseline gauze and mineral oil
    1. Dry oven 350° 1 hour
    2. Add 5% water to vaseline and mineral oil 250° F 1 hour  
(we sterilize 20 minutes)
    3. Moistens gauze before adding vaseline for vaseline gauze.
- If a break in technique occurs, do not hesitate to speak up. In most cases it can be corrected and the safety of the patient is not endangered.

#### Contaminated cases:

1. Hands
  1. Wash with soap and running water at least 1 minute, Dry on individual towel. Rinse with 70% alcohol and allow to dry.
  2. Rinse hands under running water. Rub limepaste into hands for two minutes. Rinse thoroughly with running water. Limepaste.
 

Chlorinated lime 30% Cl <sub>2</sub>	200 gms
Sodium carbonate	80 gms
Sodium Bicarbonate	200 gms
2. Goods and Instruments
 

Scrub nurse should gather all opened instruments (before breaking scrub) into container which fits sterilizer (include suction and gloves) In pan should be enough cold green soap solution or 2% sodium carbonate to cover instruments. This pan, including tray and suction bottle is autoclaved or boiled for 20 minutes. Soiled linen, gather in bag (clean bag) and send to laundry (mark contaminated) Do not touch outside of bag with contaminated hands.

Bloody sponges collect in waterproof paper bag of several thicknesses of newspaper and burn.

Cover spots of pus on floor, shoes and furniture with lime paste and allow to stand 10 minutes before wiping up.

Dirty cases asr are as follows:

  - Incision and Drainages
  - Any pus case
  - Any case connected with gastro intestinal tract
  - Appendectomies
  - Hemorrhoidectomies
  - Gastric and intestinal resections

Contents of suction bottle may be poured down hopper. However.





if infections should be mixed with equal amount 10% chlorinated lime solution and allowed to stand 2 hours then pour down hopper.

Emergency sterilization i.e. shipboard, home, where proper facilities are not available.

Make the most of what you have.

Ordinary oven - dampen goods and wrap loosely in small packages

1 hour at 320 - 350° (Is very hard on goods)

Ordinary boiler - wrap goods loosely in small packages steam 1 hour in covered container.

In an emergency use clean freshly laundered cloths.

Always keep in mind the proper accepted way and use what you have to the best of your ability to accomplish that result.

---



E. C. Jenkins, P. A. Surgeon

Seamen who have their lower extremities exposed to sea water on life boats or rafts for relatively brief periods develop a condition which is called "immersion foot". If the sea water is the cold water of the North Atlantic with a temperature below 50° or possibly even 60° F, there is actual injury to the skin and subcutaneous tissue due to the coldness of the water. This feature is not present in survivors rescued in the warm southern waters. For your purpose, you need not consider this difference because the treatment aboard ship for both conditions is essentially the same.

Similar conditions, such as Frostbite, Trench Foot described in the last war, and Shelter Foot described in victims crowded for long periods in air raid shelters of London during the present war, should be classified under a common name, such as "Peripheral Vasoneuropathy after Chilling" which means that there is disturbance of function of the nerves of the extremities due to chilling. The causes of these conditions are prolonged chilling of the part, prolonged dependency and immobility of the limb, constriction and impairment of circulation due to swelling of the part, and malnutrition and vitamin deficiency (especially B and K).

When a seaman is removed from a raft or life boat, the feet are cold and swollen, they are waxy white and there are scattered areas of blueness. The feet feel heavy, "woody" and numb, and they are anesthetic to pain, touch, and temperature. There is no pulse in the peripheral vessels. This stage (prehyperemic) may last





40

a few hours to several days. The feet then become red, hot and dry and there may be increased swelling. There are bounding pulsations in the peripheral vessels, and the patient complains of a burning and tingling of the feet, and an inability to move the toes. There may be blistering, ulceration and areas of gangrene. This stage is called the hyperemic stage and may last six to ten weeks. The feet then become cold and sensitive, the swelling subsides, and there is gradual return to normal sensation. This is called the post-hyperemic stage.

The prophylactic treatment consists of greasing the skin, wearing heavy socks and loose boots, exercise and elevation of the cold extremities, and avoidance of constricting pressure on the legs. You should acquaint every member of your crew of these preventive measures. Oil is now supplied on life boats and rafts.

Treatment aboard ship consists of some very important "don'ts".  
Don't allow the patient to walk. Don't massage. Don't rupture blebs.  
Don't apply heat. Move the patient to cool quarters. Treat for shock with hot drinks, intravenous fluids, and heat to the body (but not the feet and legs). Wash the extremities with soap and water, elevate them avoiding pressure points, dust sulfanilamide powder on the raw areas, let them be exposed to the air, and turn a fan on them. Give adequate morphine and codeine for pain and give a vitamin supplemented nutritious diet as tolerated by the patient. Keep him flat in his bunk. Rapid warming of the extremities may cost the seaman his legs.



## BURNS

In the past the treatment of burns has involved the use of magic dyes, solutions and ointments. Dr. Charles Lund of Harvard University has brought this branch of surgery out of the realm of magic, superstition and chaos down to basic fundamental surgical principles. We know that our Navy in the South Pacific and our Army in the British Army in the Mediterranean are now following his teachings to very good advantage. His principles are essentially as follows:

- (1) Treat the shock first by replacing the plasma that leaks through the burned area.
- (2) Do not scrub the burned area or open any blisters.
- (3) Infrequent dressings.
- (4) Slight compression to the burned area to prevent excessive swelling and leakage.
- (5) Splinting the part (the hand in the functional position, and the foot in the walking position.)

If the burned area is small, it is probably all right to use boric acid ointment or vasoline next to the skin. If the burned area is large, it is probably better to use dry gauze next to the skin because dry gauze will "plug up" your leak better than greasy gauze. Use three or four layers of 4x4" pieces of gauze and then obtain slight compression with roller bandage without constriction of the area. If the hand is the burned part, after applying the dressings, bandage the forearm and hand to a wooden splint (3½ x 12") with a 2" roll of bandage in the palm. If the lower leg and foot are involved, splint the foot at right angles to the lower leg.





After the burned area is once dressed, leave the dressings undisturbed for fourteen (14) days. If you change dressings frequently, you contaminate the area with droplets from your nose and mouth, and bacteria from the air. After the 14 days have elapsed and you dress the burned area, use aseptic technique wearing cap, mask and sterile gloves.

You will be forced to give plasma and intravenous fluids according to whatever you have available. Do not wait for shock to develop. If you have a severely burned patient, start plasma running through a 16 or 18 gauge needle before you do anything else. Estimate the percent surface area involved and then give 100 cc. of undiluted plasma for each 1% of area involved above 5%. Another guide is to give 50 cc. of plasma for each point the hemoglobin is above 100. Give adequate doses of morphine.

#### F R O S T B I T E

The symptoms of frostbite are caused by damage to tissues due to exposure to cold. The part may actually be frozen, or there may only be damage to the blood vessels due to prolonged chilling. For example, if the ears are frostbitten, there is initial whiteness of the ears followed by redness, swelling, possibly blister formation and gangrene. Treatment consists of gradually raising the temperature of the part, avoiding massage and overheating, and treating the shock with stimulants and hot drinks. Boric acid ointment has been used on the ears. If the extremities are involved, elevation of the part is efficacious.



The first problem in the treatment of war wounds is the management of shock - its prevention, insofar as this is possible, or its early and adequate treatment when established.

The shocked patient presents a rapid, thready pulse, cold extremities, low blood pressure, shallow respirations and partial to total loss of consciousness. Pallor is generally present. Hemorrhage and severe injury cause these symptoms in war wounded. The volume of blood in the body is reduced to the point where the heart does not have any to pump, and adequate blood circulation ceases.

To treat this condition, you must replace by transfusions of whole blood, blood plasma, or intravenous saline, the blood volume lost. Do not try to treat a fully-developed case of shock by administering intravenous therapy through a 22-gauge needle. This gauge needle is too small. Use as large a needle as you can insert into the vein (14 to 18-gauge). Heat applied to the body and hot fluids by mouth are helpful but not as efficacious as intravenous fluids. This is an emergency which requires rapid treatment. Administer the blood, plasma or saline immediately and rapidly until the systolic blood pressure approaches 100 mm. of mercury and then slow the administration to 30-40 drops per minute.

-When treating shock due to chest injuries, never use blood or plasma. These two constituents may overload an injured pulmonary circulation and give the patient pulmonary edema, which may be followed by death. Use saline, or 5% glucose in water or saline, in the treatment of shock due to chest injuries. Give the infusions slowly (at about 40 drops per minute). It is realized that the results from infusions in the treatment of shock are only temporary, but in chest injuries this procedure is more safe.





Assistant Surgeon C. B. Mayes

April 23 1943

Function: To hold in place dressings and splints and to support joints and certain fractures.

## Requirements:

1. That it efficiently hold the dressing or splint in place.
2. That it be comfortable
3. That it does not come off.
4. That it have a neat appearance

## Materials:

1. Gauze, which is most suitable for the majority of cases.
2. Muslin: used when great strength is required, but cannot be so neatly applied and more skill is required to use them properly.
3. Woven knit bandages: "ace or adaptic" are useful for many purposes - minor sprains, varicose veins, ulcers, etc.

Bandages may be better accommodated to the shapes of surfaces by occasionally turning or reversing of the bandage.

c

There are very many special bandages that have been advocated but in general if the above requirements are followed, any part of the body can be satisfactorily covered.

## Type of bandages to be demonstrated:

1. Head bandage \*\* Be sure bandage is low enough to include occipital protuberance. Reinforce with adhesive.
2. Finger bandage (a) wet (b) dry.
3. Reverse
4. Spica
5. Figure of '8'
6. Four tailed --Fracture of mandible
7. Valpeau bandage

-----



By J. R. Nickerson, Asst. Surg. (R)

October 3 1943

GENERAL REMARKS

The prime requisite in the treatment of fractures from the time of the injury until healing is complete, is immobilization. Early is of great importance for comfort of the patient and to prevent further injury to the part, later it facilitates healing and maintains the position of the fragments. Of all the external methods of immobilization, none are as efficient and satisfactory in the treatment of most fractures as plaster casts and splints. Plaster dressings are made to fit each individual. They are also relatively cheap and large quantities can be stored and carried in small space.

When one remembers that immobilization is of great importance in the healing of any wound, the many uses of plaster dressings become obvious including torn ligaments, dislocations, serious infections, lacerations and burns.

PREPARATION OF PLASTER:

A plaster dressing consists of gauze bandage treated with starch, the mesh of which is filled with plaster of Paris. There are excellent commercial preparations available in various widths on board ship. It is easily made by working the plaster into the gauze with the palm of the hand, however, this is a time consuming procedure.

Technique of applying plaster.

1. Skin preparation  
All abrasions and lacerations should be cleaned and dried.
2. The bandage should be left in the paper wrapper until ready for use. Handle it gently - plaster falls out of it.
3. Wetting the plaster: Immerse until bobbling ceases then you can be sure that bandage is wet through. Place it in the bucket carefully, never drop it or throw it in.
  - (a) Cold water plaster sets 5 - 7 minutes
  - (b) Warm water - plaster sets 3 - 5 minutes
  - (c) Warm water and salt plaster sets 3 minutes.
4. Never squeeze the bandage as you lift it from the bucket. Use it dripping wet for best results.
5. Lay the plaster on as you would wall paper. There should be no wrinkles or ridges. Never put traction on the bandage as you lay it on.
6. Rub the cast as you put the plaster on, this results in an homogenous layer which gives it strength.
7. Put joints in neutral position.
8. Use padded (sheet wadding) or unpadded casts. The latter required great skill in application.

Dangers in Use of Plaster Dressing.

1. Circulatory disturbances - ischemia, manifested by pain, numbness, swelling, cyanosis (blue dusky appearance)
2. Pressure  
Manifested by pain, foul odor, drainage through cast.





P. A. Surgeon A. B. Kurlander

April 26, 1943.

A fracture is the sudden breaking of a bone by some form of violence. The immediate causes of fracture are:

1. Direct violence in which the break in the bone occurs at the point struck.
2. Indirect violence; in which the bone is broken at some distance from the application of violence.
3. The sudden action of muscles which sometimes fractures bones such as the tip of the elbow.

Fractures are divided into two great classes, simple and compound.

A simple fracture is one in which the bone is broken, but in which the broken fragments have no communication with the external air.

A compound fracture is one in which the ends of the broken bone protrude through the skin.

When a bone is broken, the victim of the accident if he is conscious may hear or feel the bone snap and feels intense pain upon attempting to move. The injured part swells rapidly and there is often a pouring out of blood from the wound into the flesh about it.

An abnormal mobility or loosening motion is perceptible on examining the bone. Usually there is loss of function of the limb and some deformity is usually present.

A person who has sustained a fracture also suffers from shock and sometimes from bleeding which may be severe.

The injured resulting from fractures are not limited to those occurring at the time of the accident. Unwise attempts to use the injured extremity may cause or increase displacement of fragments, increase the lacerations of soft parts, and perhaps lead to penetration of the skin by the ends of the bone.

Therefore, a safe procedure is outlined below and if followed will greatly aid in the prevention of further disability following the original injury.

1. Apply some form of protection with traction if possible before the patient is moved - "Splint 'em where they lie."
2. Avoid unnecessary manipulation.
3. Transport with extreme care and gentleness. In fractures of the upper extremity the Murray-Jones hinged splint is the splint of choice. On the lower extremity the Keller-Blake hinged half ring splint is the splint of choice.



4. Prevent and treat shock.
  - (a) Keep patient warm with blankets, etc.
  - (b) Provide morphine for relief of pain.
  - (c) Supply fluids.

After patient has been transported to the place where further treatment can be carried out, a complete and thorough examination should be made causing as little additional injury as possible.

Compound fractures create additional problems. Tetanus and gas bacillus antitoxin should be administered to all cases of compound fracture unless there is some definite contraindication. All wounds associated with such fractures should be considered as contaminated whether the wound has been made from within or without.

First aid treatment consists in protecting the wound by the cleanest dressing available, proper splinting, with traction as described for simple fracture and transportation to a hospital.

Compound fractures are always emergency cases. Every 1/2 hour counts. During the first few hours the surgeon may be able to prevent any appreciable infection.

The operative treatment aims at the removal of all devitalized tissue, foreign material and contamination organisms, provision for adequate drainage, reduction of the fracture and maintenance of reduction by immobilization.

A few helpful reminders in the care of fractures are as follows:

1. Treat every case of injury as a fracture until it is proven to be otherwise. Protect and immobilize all injured patients until the diagnosis is made. "Splint 'em where they lie."
2. Always use gentleness and care in handling any broken limb. Roughness is inexcusable.
3. Use only the simplest methods of examination.
4. Eliminate all unnecessary handling of the injured part.
5. Never deliberately search for crepitus.
6. Disturb the patient as little as possible.
7. Do not be deceived by the absence of deformity and disability, in many cases of fracture, some ability to use the limb persists.
8. Make sure that you are not dealing with more than one fracture.





9. See that patient has an early suitable xray examination.
10. Examine for nerve lesions and for associated injuries before attempting reduction.
11. Watch the circulation distal to the injury.
12. No splint is used to reduce a fracture. A splint is intended to immobilize or maintain reduction.

### Head Injuries.

All cases of traumatism of the head whether the skull be fractured or not should be regarded as potentially serious. The presence or absence of a fracture of the skull is of subordinate importance to the injury to the brain itself. Severe injury to the brain with lacerations of the brain substance and permanent injury may occur without any fracture of the skull itself. On the other hand, extensive linear fractures of the vault of the skull may occur without loss of consciousness and without appreciable symptoms. It is very poor judgment to subject the patient with a head injury to an immediate xray examination. The examination may do the patient harm and will not influence the primary type of treatment. Xray should be deferred until the patient is out of danger, unless a depressed fracture is suspected.

A serviceable routine for the treatment of head injuries may be outlined in the following:

1. The patient should first be placed at absolute bed rest. (Flat in bed).
2. The treatment of shock, if present, must precede all other therapy.
3. Ice bags may be placed to the head.
4. If restlessness is marked, sodium lumonal in 2 grain doses may be given hypodermically. If patient is conscious, small doses of phenobarbital may be given by mouth.
5. If pain is present, administer simple analgesics such as aspirin, phenacetin or combinations of these drugs. If unrelieved, small doses of codein may be used. Do not give morphine in cases of head injury.
6. Supply fluids to the patient up to 2500 cc. daily. If patient is unconscious,, administer fluids by vein.
7. Watch for hemorrhage or for spinal fluid flowing from the ears. If present, place a sterile dressing over the ears.
8. Watch for the presence of vomiting. If it occurs and is projectile in type, it is an indication of increased intracranial pressure. Do not permit patient to inspire vomitus



9. The pulse, respirations, temperature and blood pressure should be carefully observed and recorded at least every hour at first.

#### A Few Remarks Concerning the Basic First Aid Treatment of War Wounds:

In the combat zone you will immediately find yourself confronted with an environment and a class of traumatic lesion more or less foreign to you. You will no longer be able to choose your own conditions but must make the best of the facilities available. "One does what one can, where one can, when one can, how one can."

Remember that war wounds differ from other wounds only in their severity and size. Remember what basically you are trying to combat.

1. Hemorrhage
- 2 Shock
- 3 Infection

The following may be laid down as the basic procedures in the first aid treatment of war wounds:

1. Treat hemorrhage

- (a) Control bleeding by means of direct pressure, ligature, or tourniquet. If a tourniquet is used, be sure to loosen it for several minutes during each hour that it is in place.

2. Treat Shock.

- (a) The first needs of the wounded man are for rest, warmth, relief of pain, and drink.
  - (1) Supply heat to the body and extremities.
  - (2) Relieve pain by the liberal use of morphine.
  - (3) Supply fluids either by mouth or intravenously or in the form of whole blood, or plasma. Warning: Do not give fluids by mouth to unconscious persons or to persons suffering from wounds of the stomach or intestines.

3. Immobilize all fractures that may be present.

- (a) This is important if secondary wound shock and increased local damage is to be avoided.

4. Treat soft tissue wounds simply.

- (a) If loose fragments of bone, cloth, or other debris are present in the wound, they may be picked out with sterile forceps.
- (b) Do not probe for bullets.
- (c) Do not pour antiseptic solutions into wounds.
- (d) Do cover the wound with a simple sterile dressing of adequate size.





5. Administer Tetanus and Gas Bacillus Antiserum prophylactically.

6. Administer sulfanilamide prophylactically.

- (a) From five to twenty grams should be introduced into each wound depending on its size.
- (b) The drug may be administered by mouth. Start with an initial dose of two or three grams and give one gram at four hour intervals.

Remember that in war any set plan can seldom be carried through in any detail. Do the best you can under the prevailing circumstances.

- - - -



E. C. Jenkins, P. A. Surgeon

The treatment of traumatic wounds aboard ship and in the field, under combat conditions, is a science unto itself. The principles of such treatment were learned from bitter experience during the First World War, and then had to be re-learned during this war. The treatment of war wounds in the same manner as you treat wounds incurred in civilian life only invites catastrophe.

The first thing to be done in every casualty is to control hemorrhage. You have been trained in the judicious use of the tourniquet. Most of the hemorrhage you will encounter should be controlled by pressure dressings. If a spurting vessel is seen, it will be necessary to clamp it with a hemostat. Under the conditions under which you will be forced to work, it probably will be a better procedure to apply dressings about the hemostat and let it remain in place for forty-eight hours, rather than try to apply a ligature to the vessel.

When applying a shell dressing, or an abdominal pad to a wound, do not touch the side of the dressing which is to be placed next to the wound. In using roller bandage, always bandage a limb toward the body with enough compression to stop mild hemorrhage and prevent swelling, but not enough compression to constrict blood supply.

After hemorrhage has been controlled, you should relieve pain immediately by adequate doses of morphine ( $1/4$  to  $1/2$ ) grain and treat shock with intravenous therapy and immobilization of injured parts. Severe soft tissue injuries should be splinted. You will have intravenous saline and plasma at your disposal. In severe injuries, do





not wait for shock to develop, give plasma prophylactically. If in doubt as to whether a limb is fractured, splint it. It will not harm, and it may do some good.

In sucking wounds of the chest, the man lives or dies depending on what emergency treatment you give him. All books agree that compresses should be applied immediately. We further advise that you apply wide, overlapping strips of adhesive tape over, well above, and below the wound.

To know what not to do in the treatment of war wounds is more important than to know what to do. Never approximate the edges of any wound sutures. Keep fingers, antiseptics and instruments out of wounds. Never probe for any missile or foreign body. Remove only foreign material which is readily accessible and visible. A wound that has been sutured invariably becomes infected as do wounds that have been traumatized by probing. Antiseptics poured into wounds are of no value and they may destroy tissue or cause the formation of scar tissue around tendons or nerves. If you cannot refrain from using the Cosmetic Ritual of the Medical Profession, dab a small amount of "paint" around the edges of the wound but do not pour any of the antiseptic into the wound.

If the wound is grossly contaminated, remove the accessible foreign material and sprinkle four grams of the available sulfa drug into the wound. Some very reputable surgeons frown on the topical use of sulfa drugs. Reports from the South Pacific by our Navy indicate that the local use of sulfonamides is efficacious and the physicians of this war are not seeing the malodorous, gangrenous wounds that were seen during the last war. They attribute this improvement to the use of sulfonamides.



Probably clean-appearing wounds should not receive local sulfonamide treatment. Use your judgment and do not indiscriminately treat all wounds with "sulfa". If you do, most of the time you will be "firing cannon balls at fleas". It has been reported that as high as 36% of persons receiving sulfonamide therapy develop a hypersensitivity to the drug. When the drug is administered the second time, this hypersensitivity manifests itself by fever, dermatitis, conjunctivitis, and kidney complications. By placing sulfonamides in all minor wounds, you make it impossible to use the drug again on a certain number of these seamen. Some of these men, who you have made sensitive to the drug, may develop at a later date pneumonia, blood-stream infection, or a bone infection, and it would probably be impossible then to use sulfonamides.

The following is an example as to how you should treat a wounded seaman: A seaman on the main deck is struck in the left thigh with a piece of shrapnel. It cannot be ascertained whether or not the femur is fractured, and there is only slight venous hemorrhage. The wound appears grossly contaminated. Sprinkle four grams of sulfonamide into the wound and apply a shell dressing, being certain that you have not touched the side of the dressing next to the wound. One-half grain of morphine is then administered. A Thomas Splint is applied where the man lies. He is then removed to the sick bay and given 500 cc. of plasma and a "booster shot" of tetanus. When in doubt, "Splint 'em".





position can be attained by placing a two-inch roll of bandage in the palm and bandaging the hand and forearm to a wooden splint, about 3" wide and 12" long. In splinting the lower limb, the foot is always supported at right angles to the lower leg in the so-called "walking position."

Infected wounds are characterized by redness, increased heat, swelling, and later on, pus formation (suppuration). Red streaks (lymphangitis) in the adjacent skin and enlargement of the regional lymph nodes (lymphadenitis) mean invasion of the lymph system. The general principles of the treatment of infected wounds are: (1) apply heat - (2) elevate the part - (3) place it at rest. On board ship, it is rather difficult to maintain sterile solutions, therefore probably dry heat (hot water bottle) should be used in preference to wet dressings. If wet dressings are used, use them only for one-half hour, three times per day. Continuous wet dressings waterlog the tissues. By "Elevate the part" is meant that if the leg is the infected part, the patient is placed in his bunk and his leg is elevated on sea bags so that it is the highest part of the body. If the hand is to be elevated, place the patient flat in his bunk and have the hand more elevated than the elbow, and the elbow more elevated than the shoulder. To rest the infected part, it should be splinted and the patient maintained at absolute bed-rest.

Remember, more harm is done from over-treating a wound than under-treating. Do not change dressings unless they are grossly soiled. Every time you remove dressings, you introduce new infection. Nature is a wonderful healer. "You dress them (once) God will heal them." Do not incise and drain abscesses. Apply heat. Have a healthy respect for the oral administration of the sulfonamides. Give them only in selected cases that have lymphangitis and lymphadenitis, and then with plenty of fluids, and a prayer.



## The Use of Sulfonamides With Some of the Dangers Encountered.

C. B. Nyges, Assistant Surgeon

4-30-43

The sulfonamide group of drugs has been responsible for many deaths and for many severe reactions. A fair number of these reactions might have been avoided with more intelligent use of these so valuable drugs.

Reactions that may be expected are:-

- (1) Chills and fever
- (2) Dermatoses - usually mild but may be severe
- (3) Renal calculi
- (4) Blood dyscrasias -- agranulocytosis and pupura hemorrhagica.
- (5) Mental sluggishness.

There are five of the sulfa group of drugs that are in more or less every day use.: Sulfonilamide, sulfapyridine, sulfathiazole, sulfadiazene and sulfaguanidine. Of these, the first three are of most importance as far as you are concerned.

These drugs are used both systemically and locally, in powder form or ointment base.

Sulfonilamide is the most effective in treating streptococcal infections.

In the treatment of gonorrhea, sulfathiazole is the drug of choice, being as effective, and at the same time, less dangerous than the others. A safe and adequate dosage is gms. one T.I.D. for seven days. If no response allow an interval of seven days and repeat the above course. If gonorrhea persists after two courses it is extremely unlikely that the disease will respond to further dosage.

Secondarily infected wounds may be treated with sulfonamide powder, as may certain specific and nonspecific ulcerations of the penis.

Pustular eruptions of the skin frequently respond to sulfathiazole ointment (5%). Be careful not to apply the ointment or powder to the axillary or crural areas. Rapid absorption takes place and patients frequently become sensitized to the drug.





Hot weather and bright sunlight markedly increase the frequency of skin reactions. In tropical and semitropical areas it is therefore best that patients on the drug avoid exposure to direct sunlight.

If you are giving a patient one of the sulfonamide drugs, particularly sulfadiazine, and he complains of kidney pain or ureteral colic, discontinue the drug at once and force fluids. Hematuria may or may not be associated with the above symptoms; or it may be the only sign of the formation of renal calculi.

Remember that the sulfonamide drugs definitely retard mental reactions. Therefore use caution in prescribing the drug to individuals who work around dangerous machinery or whose positions require mental alertness.

There has been no report of a fatal or even a severe reaction to the sulfonamide group of drugs, except in previously sensitized individuals when the dosage has been moderate and the period of administration has been limited to ten days.

- - - - -



5

## INSTRUCTIONS TO PHARMACIST'S MATES IN THE USE OF

### ANESTHESIA

D. C. Jenkins, P. A. Surgeon

.....

One of the most important duties which a pharmacist mate is called upon to perform is to give anesthesia for a surgeon while he operates.

This task should never be taken lightly because the risk involved in the administration of an anesthetic agent is usually greater than the risk of the operating procedure itself. However, it should be recalled that the Corpsmen of the services made an enviable record in the First World War in the administration of anesthesia; in fact, they gave most of the anesthesia and gave it well.

On board ship there are probably only two anesthetic agents which you will be called upon to administer. These are, namely, ether by the open drop method, and sodium pentothal intravenously. It would be useless to discuss the indication for the use of various anesthetic agents because the operating surgeon always will select the anesthesia and you will be called upon to administer it. It should be said in passing, that sodium pentothal should be used only for short operations lasting one-half hour or less and where muscular relaxation is not imperative. Sodium pentothal should not be used on any patient who has hemorrhaged, or who is in shock, or even anyone who, you believe, might go into shock. Even in this day and age, open drop ether is the safest anesthetic agent of all the known anesthetics, and is the anesthetic of choice for patients who have hemorrhaged and also patients who are bordering on shock. It can be given for long periods of time and affords good muscular relaxation.

For the administration of open drop ether, the patient is placed on his back, a few drops of mineral oil dropped in each eye, and a small amount of





vaseline rubbed on the face where the mask will be placed. Then a damp towel, after being folded until it is about three inches wide, is placed across the eyes. A mask, which has been covered with twelve thicknesses of gauze, is held three to four inches from the face, and the administration of the ether begins as the mask is lowered slowly into position. A fair guide to the dropping rate, which is only approximate, is twelve (12) drops the first minute, twenty-four (24) the second minute, forty-eight (48) the third minute, and ninety-six (96) the fourth minute. It has been estimated that 6% or 7% ether vapor under the mask is necessary for the maintenance of anesthesia, once it is established. This percentage corresponds to about forty-eight drops per minute. It is estimated it usually takes 10 to 15 minutes to establish anesthesia. To summarize the rate of ether administration, we may state that during the first fifteen minutes, it is carried as rapidly as possible to full saturation of the mask - about 100 drops per minute. During the second fifteen minutes, the rate is lowered to fifty drops approximately; during the third fifteen minutes, to thirty drops, and from this time on, it is carried somewhere near the last figure.

As the patient is anesthetized, we may say, for all practical purposes, he descends through three stages of anesthesia. The first stage may be called the stage of analgesia and includes the period from the beginning of induction to the loss of consciousness. During this stage, breathing is usually rhythmic and there are no special signs for which to watch. The second stage is called the dream stage or the excitement stage. During this stage the patient is very apt to hold his breath, vomit, cough or swallow. The important thing is to push the anesthesia through this stage as rapidly as possible to the third stage of



surgical anesthesia. When the patient has reached the stage of surgical anesthesia, the breathing becomes regular and rhythmic, the abdominal muscles are relaxed, the patient breathes more with his abdomen than with his chest, and his eyelid reflex is gone. Pupillary signs are usually of no value because of the pre-medication which has been given.

It is my opinion that the few signs of anesthesia just given are sufficient to know until you have given ether under supervision. The pre-medication previously mentioned consists of one-quarter ( $1/4$ ) grain of morphine and one (1) one-hundred-and-fiftieth ( $1/150$ ) grain of atropine sulphate given a half hour before the anesthetic is begun. These dosages may be used for a man weighing one hundred and fifty pounds who is to receive ether or sodium pentothal.

In the administration of sodium pentothal, the first important thing to master is to be able to insert a needle into a vein far enough so that it will remain in the vein throughout the operation. Veni puncture can best be taught by demonstration and not by writing about it. We hope to teach you a satisfactory method of introducing a needle into a vein.

Sodium pentothal is a powder and usually comes in one-gram vials. When the one gram is agitated with 40 cc. of distilled water, you have a solution of  $2\frac{1}{2}\%$  sodium pentothal, which is the correct concentration for administration.

The only safe method of administering sodium pentothal is slowly. First, you aspirate  $1/2$  cc. of blood into the syringe to prove that the vein has been entered properly; secondly, you inject one (1) cc. of the solution and observe the patient for thirty seconds, watching for any abnormal effect a small quantity of the drug may have on him. The patient is then asked to count slowly, and the drug is injected intermittently, injecting about one (1) cc. every thirty seconds until the patient ceases to count. The patient usually will stop





breathing for 15 to 30 seconds at this stage, and no drug should be injected until he begins to breathe again. It is well to pinch the patient on the inside of the arm after he has ceased counting; if he does not move, your anesthesia is sufficient. If he moves, inject one (1) cc. more of the drug.

Administer only enough of the drug to keep the patient from moving. Never allow anyone to force you to inject sodium pentothal rapidly. Remember, it is better to have a live patient than a satisfied surgeon. It is recommended that oxygen be administered with every pentothal anesthesia, but this is impossible to carry out on board ship. The best advice I can give you concerning pentothal is to give a patient just enough to keep him on the operating table, but still moving slightly. A moving or complaining patient is a live patient and that is the way to keep him - alive.

In closing, I might say there is a fourth stage of anesthesia called the stage of respiratory paralysis. This stage represents the period beginning with respiratory paralysis and ending with heart failure and death. It is fore-shadowed by very shallow breathing, very dilated pupils, and falling blood pressure. It is always wiser to keep your patient too lightly anesthetized rather than too deeply. If you are unable to determine the depth of anesthesia, stop the administration for a few minutes. The patient will give you some physical sign, such as swallowing, return of the lid reflex, or deeper respirations, which will help you in determining the depth of anesthesia.

I hope these few points will serve as an outline to help you in the future in the administration of anesthesia.



On the How, When Where and Why of Splints - Artificial Resuscitation.

R. A. Bonner Jr, A. S. (R)

Aphorism #1 in American College of Surgeons' Outline of the Treatment of Fractures clearly states the "where and when of splinting.

"Treat every case of injury as a fracture until it is proven to be otherwise. Protect and immobilize all injured patients until the diagnosis is made. Splint 'em where they lie."

A splint is anything used to protect and immobilize. The three most serviceable and most widely used splints are:

- (1) Thomas leg splint (most popular present day modification is the Keller-Blake).
- (2) Thomas arm splint (most popular present day modification is the Murray Jones)
- (3) Stock Perforated Aluminum leg splint with foot attachment.

(a) Pillow splint - often more handy and useful.

It is your duty to master the above equipment so that their application can be skillfully done even without sight.

---

The Thomas Leg Splint is the splint of choice for the lower extremity. The splint consists of a ring of 3/8 inch iron covered with boiler felt leather set at such an angle to two side stems that it fits round the upper thigh with the posterior more curved part of the ring under the tuber ischii and the anterior flatter part just below and parallel to Poupert's ligament. The outer stem is joined to the middle of the ring. The inner stem slightly in front of the middle and they converge at their lower ends where they are continuous at a level of 3 or 4" below the float - a notch in the crossbar serving for the attachment of extension tapes.

The Keller Blake modification consists of a 1/2 ring with an anterior strap.

### HOW.

The shoe must be left on; the clothing must be undisturbed, the wound must be kept away from until the splint has been applied. The ankle hitch is first applied and firm steady traction (pull) applied by means of the hitch. The limb can now be moved and raised without further injury. The ring of the splint is guided over the limb or in the case of the K-B the 1/2 ring slid under the upper thigh from the outside and the limb supported with slings fixed between the side stems. The normal forward curve of the femur is maintained with a pad of wool opposite the upper part of the popliteal space just above the femoral condyle.





With the same object, the leather slings must be tight enough to keep  $\frac{2}{3}$  of the thigh in front of the side stems and only  $\frac{1}{3}$  behind. The knee joint is slightly flexed. It must never be allowed to hyperextend. Hyperextension strains the joint. The outer tape (of hitch) is passed over the outer stem of the splint and the inner tape under the inner stem in order to counteract the tendency to outward rotation of the foot and leg. The padded ring of the splint is pushed firmly against the ischial tuberosity and the tapes are tightened and fastened securely over the notched crossbar. A final bandage is then applied encircling the whole splint and a small frame bound with bandage is fixed immediately below the foot to support it in right angled dorsiflexion. A Thomas splint attachment is next applied to elevate the foot of the splint and keep the head of the limb from touching the bunk. Fixing the foot of the splint to the end of the bunk and elevating the bunk ten inches at its foot is of great advantage if this splint is to remain for more than 24 hours without the patient being in transit. This fixation lessens the ischial tuberosity pressure.

The Thomas Arm Splint is similarly constructed and applied but not nearly as imperative as for the lower extremity. The Murray-Jones modification employs a hinge arrangement between the ring and the stems so as to allow shoulder motion. The hitch is applied to the well padded wrist.

The Stock Perforated Aluminum Posterior Leg Splint is used for knee, tibia and ankle injuries which show little deformity. Always use the full splint which runs to mid thigh. Always pad the splint fully with particular emphasis to popliteal space and heel. Keep knee slightly flexed as with Thomas splint and foot dorsiflexed to right angle. Elevation of heel on pillow and gauze bandage encircling whole splint complete the task.

A properly applied pillow splint is a work of art, and a source of comfort to the patient. It is an individual tailor-made splint and is used in knee, tibia and ankle injuries which can be made comfortable by immobilizing without traction. To be preferred to the ~~Aluminum~~ Aluminum Splint except in cases with associated flesh wounds requiring frequent dressing.

The following list of splints is not a complete one but merely a review of the commonly used ones. It is not our intention that all or any of these types be expertly applied by you but it is fully hoped that your over all knowledge of splints be widened by the name, shape and general usage of such splints. In the course of your duty you may find yourself with more patients than equipment and it would certainly be most appropriate to improvise such lacking equipment as the situation demands. Thus a review of splints seems in order. Please handle such of these splints as we are able to demonstrate and never fail to examine such equipment at any time or place. Any medical officer - if approached by one of you desiring honest information would be glad to point out the salient features of any of these splints as applied by him to any individual case.



A. Board type:

1. Flat surface - chiefly used for spine and pelvis.
2. Linton 5" x 1" paddle plank strapped to side of body running from axilla to below foot - hip, thigh, knee, leg.
3. Posterior Arm Board - paddle 3" x 1 1/2" plank strapped to underside of arm running from axilla to below fingers. Purely emergency use for elbow, forearm, wrist.
4. Tongue depressor - padded.

B. Lying type:

1. Insufficient toes.
2. Forearm to arm - elbow fractures.
3. Arm to chest - humerus.

C. Bandage type.

1. Figure of 8 - clavicle
2. Sling - shoulder
3. Swathe added - humerus
3. Circular leg - fibula
4. Sayre - acromial clavicular - clavicle
5. Cuff - collar humerus, elbow
6. Barton - jaw

D. Patented Fracture Appliances:

1. Cervical leather collar - neck
2. Cross T Clavicular
3. Webbing - clavicular support
4. Interior - elbow
5. Jones - posterior Elbow
6. Coaptation splints
7. Colles splint
8. Boechler leg splint - bunk splint
9. Hodgens Leg Splint with balanced traction
10. Walking Caliper Splint
11. Airplane Splint - humerus
12. Lateral Arm Splint
13. Banjo Splint - fingers and toes
14. Hyperextension Frame - spine
15. Roger Anderson Well - leg.  
Counter traction splint - hip
16. Pearson leg attachment refinement in hospital treatment
17. Forearm Splint
19. Cockeys Hand
20. Jones Traction Splint
21. Speed Hand Splint- Septic Hand's
22. Balkan Frame
23. Bradford Frame - spine- pelvic

E. Plaster of Paris





The following dozen general rules are to be learned in principle and painstakingly applied in practice. Note the fact that every rule has the patient and not the attendant in mind. However, the more work sought after to begin with means less work has accumulated to be a task at a later date.

\*(1) Apply slow steady pull in the normal line of muscle pull of the part being handled. This is a must in the handling of fractures. Failure to do this results in failure of the splint. Remember that a small fracture may mean a large disability.

(2) Make no constricting turns regardless of site or proposed purpose. If you lack the knowledge or ability or both to aid the patient, don't abuse the patient.

(3) When padding is necessary, use it only between splint and part. Never pad both sides of a simple board splint for example. Simple bandaging of the outer surface is enough with all padding on the inner surface.

(4) Keep constant vigil of the circulation of any part placed in a splint of any kind for any reason. Skin warmth, color and sensation and pliability.

(5) Splint should effectively immobilize the joint above and below the site of fracture. This rule is not to be broken by the amateur. Medical advice must be sought before altering.

(6) Body folds not accessible due to splinting should be protected against abrasion by powder and padding.

(7) Cautionary note: - Splints made to fit everybody rarely fit anybody!

(8) Every joint which does not need to be immobilized must be actively exercised from the first day of injury.

(9) Functional inactivity imposed by splints leads to circulatory stasis with resultant waterlogging of the tissues with sero-fibrinous fluid. Guard against this by elevating affected part and checking splint to ascertain any possible constriction.

(10) Quadriceps exercise imperative during splinting of lower extremity for any cause. This is to be begun on first day of injury and continued until full recovery.

(11) Shoulder frequently freeze unless they are moved early and often following fracture of the forearm or wrist. Voluntary motion only.

(12) Never "help" a patient by ~~fixing~~ bending his frozen joint. Great damage can be done in this innocent fashion. Any method fair or foul is to be used which encourages the patient to move his own joint which is not necessarily being splinted.

- - - - -



## SANITATION AND DISINFLECTION OF SHIPS.

P. A. Surgeon A. B. Kurlander

April 30 1943

Ship Cleanliness is essential to good health. The same rules of sanitation that apply to houses apply to ships as well.

The following are necessary requirements for a "clean" ship.

1. Mechanical cleanliness.
2. Adequate provision for the disposal of the waste products of the ship and her company.
3. Adequate apparatus and opportunity for frequent baths.
4. Water for drinking and cooking purposes to be from a supply of known purity.
5. Wholesome unspoiled food which is sufficiently cooked to kill parasites and disease organisms which may be in it.
6. Adequate protection of crew and passenger against rats and vermin.
7. Adequate ventilation of forecastle, cabins, galleys, and fireroom.

One of the greatest menaces aboard ship is vermin. Of these the most prevalent is the cockroach which can be gotten rid of only by frequent fumigations and scrupulous cleanliness. Cockroaches are prone to be found around the "head", pantry and galley. The various roach pastes, sprays and powders as a rule afford only temporary relief since they usually kill only the adults and leave the eggs unharmed.

While it has not been proven that ants spread disease, they may be a disgusting nuisance aboard ship. The best way to rid a ship of them is through fumigation. To keep the vessel free of them there are several good ant poisons on the market. The basis of these is arsenic and honey. The poison is put out in small baking powder tins, the top of which is slightly bent in at one place and the lid applied. The can is tacked in a convenient place and should be recharged at intervals.

Lice are of three varieties, the head louse, the body louse, and the pubes louse - and when they are on board ship they mean only one thing - dirty men. The infested individual, his clothes and his surroundings should be deloused.

The head and body louse is destroyed by washing with a mixture of equal parts of kerosene and vinegar and followed by soap bath or shower. The clothing may be sterilized by steam which is available aboard all vessels. A make shift and useful steam sterilizer can easily be accomplished by the use of a large metal drum fitted with a cover into which steam is permitted to flow





Bedbugs mean dirty sleeping quarters. To get rid of them, pour boiling water or kerosene into cracks, especially around bunks. Thorough cleansing and repainting helps. The bedding should be steam sterilized at the first opportunity and the living quarters should be thoroughly fumigated.

In port, flies may be a nuisance and a source of danger due to their unclean habits. They must, therefore, be kept away from food by means of screens.

Mosquitoes are another menace to comfort and health. Mosquitoes transmit malaria, yellow fever, and dengue. Every endeavor should be made to keep the ship free from them particularly when the vessel is in malaria or yellow fever infected ports. In these areas, it is wise to sleep in screened compartments or under bed nets.

Rats and their fleas constitute a menace and source of potential infection. Rat fleas transmit bubonic plague from rats to men. Thus if there are no rats aboard ship, there is relatively little danger from plague. Ratproof ships can be built but if the ship is not so constructed she should be freed from rats by frequent complete fumigations. Between the periods of fumigation rats should be kept off the vessel by breasting off in port, putting rat guards on all mooring lines, and raising the gangplank at night. Should rats get aboard in spite of all precautions, they should be destroyed by poisoning and trapping.

#### Drinking Water:

The drinking water system on a vessel should be independent of all other systems aboard.

Water tanks should be thoroughly cleaned and flushed at the beginning of the season and at least every two weeks that the vessel is in service. After mechanical cleansing they should be filled and 1 pound of calcium hypochlorite added for each 5000 gallons of water. After standing for twenty-four hours this water should be discharged and the tanks filled with water of known safety and then securely locked and sealed. The piping system should be cleaned in a similar manner.

Ice used to cool drinking water should not come into contact with the water. Coolers should have separate ice and water compartments.

Common drinking cups should not be supplied on vessels.

A simple method of sterilizing water is by the use of calcium hypochlorite. Ordinarily 1/4 teaspoonful of the powder to 50 gallons of water will make the water safe to drink. In small quantities it may be put into water directly and dissolved by vigorous stirring. Water so treated should be permitted to stand for 1/2 hour before use.

If calcium hypochlorite is not available, drinking water may be disinfected by the addition of one tablespoon of tincture of iodine to 60 gallons of water and allowing to stand for 1/2 hour before using.



## Disinfection:

In the event of an outbreak of contagious disease aboard a vessel, certain general sanitary measures must be carried out:

1. Isolate the patient.
2. Disinfection of by heat or chemicals - of their discharges and anything that the patient has contacted.
  - a. Dishes and utensils placed in 5% solution of carbolic acid or 5% solution of calcium hypochlorite and allowed to remain for 1 hour.
  - b. All sputum and nasal discharges should be deposited on gauze or paper which should then be placed in a bag and burned.
  - c. The attendant, after performing any service for the patient should at once clean his hands by washing them in a 2% solution of carbolic acid.
  - d. In the case of an individual suffering from typhoid fever, paratyphoid, dysentery or cholera, all urine and feces should be placed in a container containing an equal amount of 5% carbolic acid or 5% calcium hypochlorite solution. Hard fecal masses should be broken up as it is difficult for the disinfectants to penetrate these masses. The excreta and the disinfectant should be thoroughly mixed and permitted to stand for 2 hours.
3. Disinfection of bed and body linen, towels, napkins, handkerchiefs, etc., may be disinfected by steam or by boiling or by immersion in 5% carbolic acid, or by immersion in a bichloride of mercury solution 1-1000.
4. Disinfection of sickroom.

Wash bulkheads and decks with strong hot germicidal solution (2-5% carbolic acid). Rubbish in the room should be collected and burned. Door knobs, bed rails, and other objects handled by patients or soiled by his discharge should be wiped with bichloride of mercury 1-1000 or 2-5% carbolic acid solution. Finally the room should be well aired and then painted.

---





68

FEDERAL SECURITY AGENCY  
U. S. PUBLIC HEALTH SERVICE  
WASHINGTON

Revised October 14, 1941

Foreign Quarantine Division Circular No. 32

To: Medical Officers in Charge, U. S. Quarantine Stations, and  
Others Concerned.

Subject: Quarantine Treatment of U. S. Army, Navy, and Coast Guard  
Vessels Upon Arrival at United States Ports.

In order to promote uniformity of procedure at United States ports in the quarantine treatment of vessels belonging to the United States Army, Navy and Coast Guard, the following supplemental instructions are hereby issued for your information and guidance.

1. Vessels of the United States Army and Navy which carry a medical officer of their respective Services, and vessels of the United States Coast Guard which carry a medical officer of the Public Health Service, upon entering United States ports from foreign ports or from ports in the possessions or dependencies of the United States are exempt from quarantine inspection provided that such vessels have not sailed from a port infected with cholera, yellow fever or plague, or in which typhus or smallpox is epidemic, and further provided that no case of these quarantinable diseases has occurred on board en route. Immediately following the arrival of a vessel coming within the above provisions at the first United States port of entry, a letter will be addressed and mailed by the commanding officer to the quarantine officer reporting the pertinent facts, including a statement by the ship's medical officer to the effect that no case of the above-mentioned quarantinable diseases occurred on board during the voyage; giving the name and rank of the ship's medical officer; and enclosing duplicate copies of the American bills of health required to be taken out by the vessels at the port of departure and each subsequent port of call on the homeward-bound voyage.

2. When two or more vessels of the smaller type, such as destroyers, only one of which carries a medical officer, are cruising together, one certificate as provided for in Section 1, above, will be accepted as the basis for the quarantine clearance of the group.

3. The provisions of this circular do not apply to vessels which do not carry a medical officer or are not certified for by a medical officer as provided for in Section 2, above.

Respectfully,  
(sgd) W. F. DRAFTER,  
Acting Surgeon General.

COPY:ehg



The following information relating to Quarantine is furnished for the use of those concerned:

Paragraph 3 (Amendment #20).

Vessels operating exclusively between Canadian ports and ports in the Continental United States and Alaska are exempted from obtaining consular bills of health at Canadian ports and from quarantine inspection upon arrival at ports in the continental United States and Alaska. Vessels operating exclusively between ports in the Republic of Cuba and in the Bahama Islands and ports in the United States, and vessels operating exclusively between ports on the West Coast of Lower California, respectively, and from quarantine inspection upon arrival at the ports designated in the United States, but such vessels may be subjected to inspection to determine rat infestation and, when found rat infested, to deratization measures. However, during the prevalence of any of the quarantinable diseases at any foreign port of departure or call, all aforementioned vessels shall obtain at any such infected port or ports from the consular officer of the United States, or from the medical officer of the United States, when such officer has been detailed by the President, a bill of health, in duplicate, in the form prescribed by the Federal Security Administrator, and such vessels shall be subject to quarantine inspection upon arrival at any port in the continental United States or Alaska.

N.B. Ports in Newfoundland, St. Pierre and Miquelon Islands are considered to be Canadian ports.





MINIMUM REQUIREMENTS ON MERCHANT  
MARINE VESSELS



Drugs, Chemicals & Surgical Supplies

Drugs and chemicals listed in U.S.P. and N.F. standard, unless otherwise indicated

NO.	ITEM	UNIT	AMOUNT
1.	Acetylsalicylic Acid 5 gr. (Aspirin)....	500 per bottle.....	2
2.	Alcohol, 70% medicated (rubbing) .....	pints .....	4
3.	Alkaline aromatic tablets .....	100 per bottle.....	3
4.	Aluminum Hydroxide tablets .....	500 per bottle .....	1
5.	Ammoniated Mercury ointment, 5%.....	lb.....	1
6.	Anesthetic Antiseptic Ophthalmic Ointment.....	Tubes.....	6
7.	Ascorbic Acid Tablets (250mg).....	500 per bottle.....	2
8.	Aromatic spirit of Ammonia .....	8 oz. bottle .....	1
9.	Bismuth subcarb. powder .....	1 lb. bottle.....	2
10.	Boric Acid Ointment .....	lb.....	1
11.	Boric Acid Powdered .....	1 lb. can. ....	2
12.	Brewer's Yeast Tablets (or equal).....	500 per bottle.....	2
13.	Calomine, Lotion with Phenol 1% .....	pints .....	2
14.	Carbon Tetrachloride (not for open wounds) ...	1/2 lb bottle.....	4
15.	Castor Oil .....	Pint .....	2
16.	Chlorine of Lime .....	12 oz. bottle .....	6
17.	Compound cathartic pills, vegetable .....	500 per bottle .....	1
18.	Compound cresol solution .....	1 lb .....	2
19.	Cough Mixture: Syrup of White Pine with Codeine (1 gr. per fl. oz) (or any standard mixture) .....	pint bottle .....	4
20.	Ear Drops: C. P. Glycerine 0.463 oz. Antipyrine 0.87 gr. Benzocaine 0.23 Gr.....	1 oz in dropper bottle....	2
21.	Ephedrine Sulphate Tablets, 5/8 gr .....	100 per bottle .....	1
22.	Epinephrine Chloride, 1:1000 (1 cc) .....	12 amps per box.....	1
23.	Liquid Petrolatum (heavy) .....	pints .....	2
24.	Magnesium Sulphate .....	lb. container .....	2





25.	Methenamine Tablets, 7.5 gr. (for Heat Sterilization)		
		Bottle of 100.....	1
26.	Mild Silver Proteinates	4.6 gr. tablets	60
27.	Narcotics: Codeine Sulphate, oral tabs. gr 1/2..	100.....	1
	Morphine Syrette, 1/4 gr.....	5 per pkg.....	2
	Paragoric .....	pints .....	2
28.	Oil of Cloves (toothache) .....	ounce .....	1
29.	Pentobarbital Soda, grs. 1 1/2 tablets .....	100 tablets .....	1
30.	Personal Insecticide (lice) .....	pint bottle .....	2
	Liquid Petrolatum .....	20	
	Tetralin (tetra-hydronaphthalin)..	12	
	Acetone .....	6	
	Copper Oleate less than 1%.....		
31.	Petrolatum, yellow.....	1 lb. ....	2
32.	Phenobarbital - grs. 1/2 .....	500 g. bottle .....	1
33.	Potassium permanganate tablets, 1 gr. ....	100 per bottle .....	1
34.	Quinacrine tablets, 1 gram (basic) .....	500 per bottle .....	1
	Quinacrine tablets, 1 gram (Tropics) ...	500 per bottle .....	3
35.	Quinine sulphate tablets, 5 gr. (basic-uncoated)	500 per bottle ...	1
	Quinine sulphate tablets, 5 gr. (Tropic-uncoated)		
	(or substitute as directed later) .....	500 per bottle .....	5
36.	Skin Antiseptic (Tincture, any other than iodine)...	pint.....	1
37.	Soap Liniment .....	pint .....	2
38.	Sodium bicarbonate .....	1b .....	1
39.	Sodium Chloride with dextrose & vitamin B1 (5mgm	1000 per bottle.....	12
40.	Sodium perborate, plain.....	1b. ....	1
41.	Solution of Pontocaine Sulphate 1/2% (eye anesthesia)	ounces.....	1
42.	Sulfanilamide Sterile Envelopes or ampules (5 gr.).....		48
43.	Sulfathiazole tablets 7.7 gr.....	500 per bottle .....	2
44.	Sulphur Ointment 10% .....	1b .....	2
45.	V.D. Prophylactic Kit (doughboy or equal) ....	2 tube set .....	100
46.	Whitfield's Ointment .....	1 lb .....	2



# UNITED STATES GOVERNMENT

1. Adhesive Plaster.....	12" x 5 yd.....	0
	1" x 5 yd.....	6
	3" x 5 yd.....	3
48. Applicators .....	72 doz. per box .....	1 bx
49. Bandages	1" x 10 yd. 12 in box, 3 boxes	
	2" x 10 yd. 12 in box, 3 boxes	
	3" x 10 yd. 12 in box, 3 boxes	
50. Packages, 4½" gauze .....	1 yd. sterile .....	1 doz
51. Packages, 4½" gauze .....	5 yr. sterile .....	1/4 doz
52. Cotton, absorbent ,, ,, .....	1/4 lb. pkg .....	12
53. Cotton elastic bandage .....	3" .....	3
54. Sterile gauze pads.....	3 x 3, 25 in box .....	4 boxes
55. Bandages, suspensory with leg strap; 8 of each size - total.....		24
56. Band Aids or equivalent, in box....	100 per box .....	4 boxes
57. Eschmarch triangular bandage .....		6
58. Bed pan, regular, white enamel .....		1
59. Bottles: 1 oz., 2 oz. 4 oz (screw tops & caps) Assorted .....		1 doz
60. Bottle hot water .....		2
61. White enamel irrigator 2 qt., complete with fittings .....		1
62. Catheter, soft rubber .....	14, 16, 18 .....	1 each
63. Folding cup, enamel .....		2
64. Envelopes, drug .....		100
65. Wax Drinking cups (Lilly Type) .....	100 per box .....	1 box
66. Ice bag, medium size 9" .....		2
67. Wash basin .....		1
68. Pus pan (8 inch) .....		1
69. Forceps, hemostat, straight, Kelly (also used as needle holder)....		3
70. Forceps, tissue (thumb) mouse tooth, 3".....		1
71. Forceps, tissue (thumb) serrated, 5" .....		1
72. Forceps, splinter .....		1





73. Mayo scissors, 5½" (or straight tissue scissors) .....	1
74. Bard Parker #3 Handle .....	1
#10 Blades .....	12
75. Khaki Canvas Roll for instruments .....	1
76. Ligatures:               With needles (silk)       medium.....	12
#1 with needles (catgut)   plain .....	12
#2 with needles (catgut)   plain .....	12
77. Bandage scissors .....	2
78. Stokes' spliter ( Navy Type stretcher) .....	1
79. Medicine droppers .....	22
80. Medicine glasses, graduated .....	3
81. Ointment Tins (empty one oz) .....	36
82. Safety pins, assorted .....	3 cards
83. Eye patches .....	6
84. Wooden splints, 18" x 3½" .....	12
85. Thomas leg splint (full ring) .....	1
86. Thomas arm splint .....	1
87. Clinical Thermometer .....	Oral .....4
.....	Rectal .....2
88. Tongue Depressors .....	2 boxes
89. Tourniquet, tape-buckle type .....	3
90. Urinal, male, white enamel .....	1
91. Syringes: 2 cc. Lucr, with 2 needles, 24 gauge 3/4" (hyodermic) in case .....	2
92. Finger cots, leather .....	1 dozen
93. Waterproof sheet, 45 x 72 .....	1
94. Salt tablet dispenser .....	1
95. Adjustable crutches with rubber tips .....	1 pr.
96. Urethral Syringe, bulb type, blunt tip, 1/2 drams .....	6
97. Truss, adjustable; single and double .....	1 each
98. Mosquito netting (Tropics) .....	(one for each bunk)
99. Book "Ships Medicine Chest & First Aid at Sea" .....	1
(U. S. Public Health Service Government Printing Office (or substitute))	



WAR SHIPPING ADMINISTRATION

Washington

OPERATIONS REGULATION NO. 67 (REVISED)

PERTAINING TO

ALL VESSELS OWNED BY OR UNDER BAREBOAT CHARTER TO  
THE WAR SHIPPING ADMINISTRATION

(Dry Cargo and Passenger Vessels and Tankers)

SUBJECT: STORES AND EQUIPMENT: STANDARD LIST OF MEDICAL SUPPLIES

The Minimum Standard List of Drugs, Chemicals and Surgical Supplies which was issued with Operations Regulation No. 67, dated July 28, 1943, has been revised and brought up to date to include instructions in the use of drugs and medicines.

There is attached a standard drug and medical supply list for use on vessels owned by or bareboat chartered to the War Shipping Administration and not carrying a ship's doctor. The list has been compiled on the basis of a 75-man crew for a voyage of three months. Vessels carrying a greater or lesser number in the crew or making voyages exceeding or less than three months' duration should increase or decrease the quantity of each item in proportion. The United States Public Health Service is revising its publication "Ship's Medicine Chest and First Aid at Sea", which will embody these drugs and will give full instructions in their use. Copies of this booklet should be placed aboard all vessels as soon as it is obtainable.

General Agents are directed to see that all vessels owned by or bareboat chartered to the War Shipping Administration are kept supplied with the medical supplies provided in the attached list. This list is to be considered a minimum, and General Agents will be allowed to add a reasonable amount in addition to those items shown in the list. If there is difficulty in obtaining locally the drugs called for on the standard list, General Agents can be informed and assisted by War Shipping Administration's Stewards Offices in the various ports as to the method and procedure of procuring the same.

(Sgd.) G. H. HELMBOLD  
G. H. Helmbold  
Assistant Deputy Administrator  
for Ship Operations

March 13, 1944





March 1, 1944

DRUG LIST

ITEM	UNIT	QUANTITY
Acid, Acetylsalicylic (ASPIRIN), 5 gr.	100 in bottle	6
REMARKS: Aspirin: For headache, colds, sore throat, grippe, fever: - 1 tablet every three hours until relieved, or until 6 doses have been taken.		
Alcohol, 70% - Medicated, rubbing	200 cc bottle	4
REMARKS: To sterilize instruments; to remove dirt from wounds; sterilize skin before giving hypodermic injections; for carbolic acid burns (apply freely to burn). If burn is around nose, mouth or eye dilute with equal parts water and alcohol.		
Alkaline Aromatic Tablets	100 in bottle	1
REMARKS: For gargle or nasal douche; dissolve two tablets in 1/2 glass warm water.		
Ammonia, Aromatic Spirits of	8 oz. bottle	1
REMARKS: For weakness, faintness, headache, shock: 1/2 teaspoon every 1/2 hour until relieved or until three doses have been given. <u>Do not give if patient is unconscious</u> ; in this case bottle can be passed under nose of patient. Date bottle and refill after one year as it loses strength.		
Applicators, wood	72 doz. per box	1
REMARKS: For cotton swabs, to apply to throat; iodine to wounds; remove specks from eye; to spread ointment, etc.		
Ascorbic Acid Tablets, 25 mgm	tablets	100
REMARKS: To prevent and cure scurvy which causes bleeding gums, sore swollen joints: Take 1 or 2 tablets daily if there are no citrous fruits in diet.		
Bandage, Gauze 1"	12 in box	3 boxes
REMARKS: For applying small dressings or finger splints, avoid over tightening.		
Bandage, Gauze 2"	12 in box	3 boxes
REMARKS: For applying medium sized dressings and splints, to arms and legs.		



ITEM	UNIT	QUANTITY
Bandage, Gauze 3"	12 in box	3 boxes
REMARKS: For applying large sized dressings and splints and dressings to body.		
Bandage, triangular, compressed	1	1
REMARKS: For use as arm sling, tourniquet, or to retain dressing in place.		
Bandage, cotton, elastic, 3"		3
Bandage, suspensory with leg strap	8 of each size	24
Bandage, Esmarch, triangular		6
Band Aids or equivalent	100 per box	4
Bed Pan, regular, white enamel		1
Bard Parker	# 3 handles #10 blades	1 12
Bismuth, Bicarbonate Powder	1-lb. pkgs.	5
REMARKS: For diarrhea: - 1 teaspoon in 1/2 glass water. For heartburn: - 1/2 teaspoon with 1/2 teaspoon sodium bicarbonate about 1 hour after eating; to relieve pain of gastric ulcers, 1 teaspoon in 1/4 glass water 3 times a day one hour after eating.		
Blood Plasma	cartons	6
REMARKS: To be placed aboard ships which carry a Ship's Surgeon or Hospital Corpsman, a graduate of War Shipping Administration Hospital Corps School.		
Boric Acid Solution, 4%	200 cc bottle	1
REMARKS: For bathing inflamed eyes; use with eye cup.		
Bottles, 1 oz. - 2 oz. - 4 oz. (screw tops and caps)		1 dozen Each
Bottle, Hot Water		2
Canvas Roll, Khaki (for instruments)		1







ITEM	UNIT	QUANTITY
Calamine Lotion, with 1% Phenol.	bottle	1
REMARKS: For itching irritated rashes such as heat rash, hives, poison ivy. Caution: Do not get in eyes.		
Case, Pins, Scissors & Forceps	1	1
REMARKS: For applying surgical dressings; sterile instruments before use.		
Castor Oil (Substitute Mineral Oil)	bottle standard size	6
REMARKS: Use heavy mineral oil as a laxative: 1 tablespoon every 4 hours until the desired results are obtained.		
Catheter, soft rubber	#12, #16, #18	1 each
Chloride of lime	12-oz. bottle	6 bottles
Compound cathartic pills, vegetable	500 in bottle	1 bottle
REMARKS: Physic: 1 or 2 tablets before breakfast or before retiring.		
Compound Cresol Solution	1 lb.	2
REMARKS: Disinfectant: Caution: This is poisonous, do not take internally. Should not be kept in same cupboard with other medicine.		
Cotton, absorbent	1/4-lb. pkg.	12
Cotton, absorbent, compressed	1-oz. pkg.	6
REMARKS: For swabs; in dressing (do not apply direct to wounds); padding splints for ears.		
Cough Mixture, Syrup of White Pine with codeine	1 gr. per fl. oz. Pint bottle	4
REMARKS: Directions: - 1 teaspoon full every three hours until cough is relieved.		
Crutches, Adjustable with rubber tips		1 pair
Dentalone	1-oz. bottle	1
REMARKS: To relieve toothache.		



ITEM	UNIT	QUANTITY
Detergent, Emulsion	pt. bottle	1
REMARKS: For removal of fuel oil, tar, etc. Apply wet dressing of Emulsion (soak dressing in emulsion and place gently over burned area and allow to remain for one-half hour.		
Distilled Water	500 cc vials	4
REMARKS: To be used only by a medical officer or graduate Hospital Corpsman.		
Dressing, battle, large	1	6
REMARKS: For large wounds; do not touch inside surface of dressing.		
Dressing, battle, small	1	18
REMARKS: For small wounds; do not touch inside surface of dressing.		
Dressing, head, adjustable	1-oz. pkg.	4
REMARKS: Cap with tying tails for retaining head wound dressing in place.		
Drinking cups, wax (Lilly type)	100 per box	1
Ear Drops (Mineral oil or olive oil)	Use from Sick Bay supplies	
REMARKS: With the patient in prone position drop oil from a medicine dropper 3 or 4 drops of heated oil. Test by dropping oil on back of the hand to see if it is too hot for skin tolerance.		
Envelopes, Drug		100
Ephedrine Sulphate tablets, 3/8 gr.	100 per bottle	1
REMARKS: To give relief from sneezing and coughing spells when due to asthma, hay fever, and whooping cough. 1 tablet every 3 or 4 hours.		
Extract of Cascara Sagrada tablets (5-grain tablets)	100 per bottle	1
REMARKS: Mild laxative. 1 or 2 tablets at bedtime.		
Eye Cup		2
Eye Patches		6
Feeding cup, enamel		2





ITEM	UNIT	QUANTITY
Finger cots, leather	dozen	1
Forceps, hemostatic straight 5"	1	3
REMARKS: For clamping bleeding arteries, veins; for use as a needle holder.		
Forceps, tissue (thumb) mouse tooth 4"		1
Forceps, tissue (thumb) serrated 5"		1
Forceps, splinter		1
Gauze, plain, compressed	1-oz pkg.	18
REMARKS: Sterile gauze for dressing wounds after treating in accordance with instructions.		
Gauze pads, sterile 3" x 3"	25 per box	4 boxes
Glucose Saline Solution, 5%	500 cc bottle	4
REMARKS: To be used by a medical officer or a graduate Hospital Corpsman only.		
Ice Bag, standard size (and throat collar)		2 Each
Ligatures, with needles (silk) medium		12
#1 " " (catgut) plain		12
#2 " " (catgut) plain		12
Litter, Metal "Stokes"		1
(Navy type stretcher)		
Army canvas stretcher		1
REMARKS: For transportation of wounded.		
Magnesium Sulphate	1 lb. container	2
REMARKS: As quick acting physic: Dissolve 1 tablespoon in 1/4 glass of water, take before breakfast. For boils use 1/4 cup dissolved in glass of hot water. Keep clean cloth wet with this solution and apply to boils for one hour. Repeat every six hours or until boil opens or healing begins.		
Medicine droppers		12
Medicine glass, graduated		3
REMARKS: For measuring doses of medicine, or for use in dissolving tablets.		



Narcotics:

Codeine Sulphate 1/2 gr.	Bottle of 50	1
--------------------------	--------------	---

REMARKS: For relief of severe pain. Take 1 tablet (1/2 gr.) with 2 tablets of aspirin. This dose may be repeated in 1/2 hour if necessary. Not more than 3 tablets should be given within a period of 4 hours, unless absolutely necessary to relieve very severe pain. Coughing spasm due to colds: Take 1 tablet.  
Severe pain due to diarrhea and colic: Take 1 tablet.

Morphine Syrette 12

REMARKS: Use only to relieve pain. Each syrette contains 1/2 grain which is a large dose. If the pain recurs a second dose may be used two hours or more after the first. Caution: Do not give morphine when respiration is slow, 12 per minute or less, nor when there is severe congestion in the lungs and blue lips and blue skin from lack of oxygen. To give, remove transparent hood, grasp wire loop and push wire in to pierce inner seal, turning if necessary. Pull out and throw the wire away, thrust needle through skin, which has been cleansed with alcohol, to at least half its length and inject solution by slowly squeezing the syrette at sealed end.

Keep a record of each dose, noting the time of administration. If the patient is to be transferred after receiving the drug, note time and dose on a tag tied to the wrist or make M and the time with blue pencil on the forehead.

Caution: The syrettes contain morphine which is a habit-forming drug. Special precautions must be taken to see that none is stolen.

Do not give to patients suffering from head injuries.

Narcotics should be given only to a patient in extreme emergency or acute pain or when other medications have failed.

Narcotics must be kept under lock and key in a safe of the Sick Bay or in the safe of the Purser Department. An accurate inventory of the supplies should be always kept.







ITEM	UNIT	QUANTITY
Narcotics (cont'd.):		
Morphine Syrette (cont'd.)		
Monthly reports on Morphine and Codeine must be rendered each month to the Deputy Medical Director, Division of Operations, W.S.A., to be received not later than 10th day of the following month. Such reports are to include the name of the patient, diagnosis, duration of illness and the amount of morphine or codeine administered.		
Oil of Cloves	1-oz. bottle	1
REMARKS: To relieve toothache, but only when the offending tooth has a cavity. A few drops of this oil on a very small ball of cotton is packed into the cavity with a toothpick or applicator stick. It sometimes helps to rub the gum with the oil.		
Oil of Wintergreen	4-oz. bottle	4
REMARKS: To be applied locally. Cover with clean dry flannel bandage. To be used for relief of pain, such as rheumatic pain in joints, or water on knee.		
Ointment, Ammoniated Mercury 5%	LB	1
REMARKS: For use on skin conditions, especially ringworm or eczemas. Caution: For external use only. Do not use on skin if skin has been painted with iodine.		
Ointment, Anesthetic, Antiseptic, Ophthalmic	tubes	6
REMARKS: Place a small film of ointment on the inner aspect of lower lid by gently pulling down the lower lid and squeezing film along the junction on lower lid and eyeball. The patient should then close his eye two or three times and then keep eye closed for a short period of time.		
Ointment, Yellow Mercuric Oxide, 1%	1 dram tube	5
REMARKS: For styes and inflammation of eyes and lids. Apply to margin of lids with cotton swab.		



ITEM	UNIT	QUANTITY
Ointment, Sulphur, 10%	1 lb.	3
REMARKS: Sulfathiazole and sulfadiazine ointment is recommended in strength of 5%. Lanoline and white vaseline, equal parts, as a base ointment can be applied to wounds, burns, etc., by covering affected parts with a thin layer of ointment. When the above ointment is not available, burns may be treated by applying wet dressings soaked in petroleum.		
Ointment, Tins (empty 1 oz.)		30
Opium & Olycyrrhiza Compound, tablets	1000 per bottle	1 bottle
REMARKS: Brown's Mixture. Dissolve one tablet in mouth every two hours for cough, bronchitis.		
Paregoric	6 oz. bottles	6
REMARKS: To relieve pain, particularly colic and cramps in intestines. For diarrhea: 1 to 2 teaspoons. <u>Caution:</u> Do not give if appendicitis is suspected. Paregoric contains opium. Keep locked up. Be certain not to give overdoses.		
Pencil, indelible	EA	6
REMARKS: To fill out Diagnosis Tags and keep record of sick and injured personnel.		
Pencil, Dermatographic (Skin marking)	EA	2
REMARKS: To mark on patient's skin, time, tourniquet applied, time and dose of morphine, etc.		
Personal Insecticide (Lice)	See Directions for insecticide powder page 13	
REMARKS: For body lice, wash entire area well with soap and water; dry. Cases of infestation (lice) should be reported to the medical officer in charge who will then direct the patient to go to the proper disinfection station to clean his body and clothing		
Petrolatum, Liquid (heavy)	Pints	2
REMARKS: Mild acting lubricating laxative. Average dose: 1 tablespoon night and morning until relieved.		







ITEM	UNIT	QUANTITY
Petrolatum, white	lb cans	1
REMARKS: Vaseline - for sunburn, skin chap, massaging, chillblains, body lice. Soak dressing in vaseline and they place gently over affected parts.		
Phenobarbital - 1/2 gr.	500-gr. bottle	1
REMARKS: Use to quiet nervous and hysterical patients without putting them to sleep. 1 or 2 pills can be repeated in 4 hours. Don't use for sleeplessness. Seasickness: 1 or 2 tablets 3 times a day. Epilepsy: 1 or 2 tablets 3 times a day. Headache: 1 tablet phenobarbital with 1 tablet of aspirin.		
Pins, Safety (assorted)	card	3
Plaster, Adhesive - 2" x 5 yds.		1
Plaster of Paris	4" rolls	6
REMARKS: To be used only under the supervision of a medical officer.		
Pontocaine, Sulphate, solution 1/2%	ounce	1
REMARKS: Eye anesthesia. Two drops placed in eye by means of eye dropper and repeated every one-half hour until relieved, <u>but not more than three such doses.</u>		
Pus Pan - 8"		1
Quinacrine Tablets (Atabrine) 1-1/2gr.		
REMARKS: To prevent malaria. Start by taking 1 tablet with water immediately after breakfast and again after supper. Skip a day and repeat. Three days later, start same program again. Keep this up only while in malaria infested areas. To cure malaria: Give 1 tablet three times a day after meals for 8 days.		
Quinacrine Tablets (basic) 1 gr.	500 per bottle	1
(tropics) 1 gr.	500 per bottle	1
REMARKS: <u>NOTE:</u> The amount received per ship per voyage should be kept. An accurate record should be kept and forwarded to Medical Department whenever requested.		



ITEM	UNIT	QUANTITY
Quinine, sulphate tablets - (basic uncoated) - 5 gr. (tropics uncoated) - 5 gr.	2500 grains	In bottles of 100 to 500 tablets
Quinine, H.C.L. - 3 gr.		
REMARKS: Not to be used for any upper respiratory infections, colds, or grippe. To be used only for the treatment of malaria in cases where other malaria drugs have failed. Directions: For acute cases of malaria 2 tablets (5 gr. each) every four hours, for eight doses or until ringing in the ears occur. For prophylactic: 2 tablets daily for three weeks, rest a week, then repeat dosage and procedure.		
Salt tablets		
REMARKS: Supply should be kept available for crews aboard ship, especially for members who work in engine room. In the tropics or under conditions where a person perspires freely - 1 tablet every 4 hours during working hours.		
Salt Tablet Dispensers		
REMARKS: To be equipped with 1500 salt tablets.		2 Dispensers
Scissors, 5-1/2" (Mayo)		2
Scissors, Bandage		2
Sodium Perborate, plain		
REMARKS: For inflamed gums, mouth ulcers, or trench mouth. 1/2 teaspoon to 1/2 glass warm water. As a wet dressing for wounds - 1 teaspoon to 1 glass water.		
Shade, Eye, single	1	2
REMARKS: For retaining eye dressings in place in treating eye injuries or inflammation.		
Sheet, waterproof	45 x 72	1
Soap Liniment	pint	2
REMARKS: To be used as directed on bottle.		





ITEM	UNIT	QUANTITY
Sodium Bicarbonate	1-lb. ctn.	1
REMARKS: Baking soda for headache, burns, sore throat, indigestion. Directions: 1 teaspoon full in a little water or milk every two hours until relieved.		
Spectacles, smoked glass		3
REMARKS: For protection against strong light and to rest inflamed eyes.		
Splints, wooden - 18" x 3-1/2"		12
Splint, Thomas, leg (full ring)		1
REMARKS: To be used to apply traction during the time that a patient is being transported or as an emergency treatment. For proper application see instructions in manual "Ship's Medicine Chest First Aid at Sea".		
Splint, Thomas, arm		1
Splint, basswood - 18"	12 in set	
REMARKS: For splinting fractured (broken) bones, to mould (shape) wood splints soak in hot water.		
Sulfadiazine tablets (7.7 gr.)	3 doz. Tablets	
REMARKS: Supply depends upon the length of the journey and the number of crew. Directions: (A) To be taken only in acute illnesses characterized by temperature of 100 degrees or above or (B) taken as a prophylactic in cases of specific infection to injury. In cases of temperature take 2 tablets, repeat every four hours for 6 doses, or until temperature falls to 99 degrees and stays at that temperature for four consecutive hours. This dosage can be supplemented by two doses of soda bicarbonate and one tablet (gr. 7.7) taken after second dose of sulfadiazine. In cases of specific infection - 2 tablets every three hours for four doses with bicarbonate of soda after second dose then stop - unless there should be clinical signs of infection or a rise in temperature (as in case (A) then follow through as directed for that particular case.		
Sulfanilamide or Sulfadiazine powdered - 5gr. or equivalent (for topical application)	pkg.	25
REMARKS: Sprinkle freely in open wounds, after controlling hemorrhage and before applying dressing.		



ITEM	UNIT	QUANTITY
Suture, catgut, boilable No. 2 threaded in needle	tube	6
REMARKS: For tying off bleeding arteries or veins and for sewing wounds.		
Syringe, Urethral, bulb type, blunt tip - 2 drams		6
Syringe, 2 cc "Luer with 2 needles" 24 gauge - 3/4" hypodermic in case		2
Tag, Diagnosis	20 in pkg.	1
REMARKS: Fill out completely as possible and tag each sick or wounded man before transfer.		
Thermometer, clinical		1
REMARKS: For taking temperatures - wash (don't boil) before and after use.		
Tongue depressors, wood	25 in bdl.	1
REMARKS: For examining throat, splinting fingers, to spread ointment, etc.		
Tourniquet, holliard type	1	4
REMARKS: Tie square knot loosely between wound and heart, insert stick, turn tightly enough to arrest hemorrhage. Do not allow tourniquet to remain in place longer than 1 minute and then release so that blood can flow freely over wounded parts; reapply tourniquet and repeat this procedure of applying and releasing until patient is in the hands of proper surgeon's care or until other means have become successful. Palliative or emergency treatment to arrest hemorrhage in addition to applying tourniquet can be attained by applying wet dressings of hot normal saline solution applied to cut or lacerated area and left in place. <u>Do not remove such dressing and do not wipe the injured parts.</u> Further means of arresting hemorrhage is outlined in "Ship's Medicine Chest First Aid at Sea" manual.		
Truss, adjustable - single and double		1 ea.
REMARKS: A truss should never be applied for the first time without instructions from the medical officer or a trained medical attendant. Incorrect adjustment of truss can be more dangerous than no truss at all. In many cases incorrect adjustment causes intestinal obstruction (blocking).		







ITEM	UNIT	QUANTITY
------	------	----------

Urinal, male, white enamel		1
----------------------------	--	---

V. D. Prophylactic Kit (Doughboy or equal)	2 tube set	100
---	------------	-----

REMARKS: See instructions for use in "Ship's Medicine Chest First Aid at Sea" manual.

Wash Basin		1
------------	--	---

Insecticide Powder

Insect Repellent (Skat) Formula No. 0-262 2 oz. cans or bottles 12 of Each

D. D. T. Insecticide (U.S. Army Standard)

REMARKS: The amount of each to be placed on ship will depend upon the size of the crew and the length of the voyage.

Book: "Ship's Medicine Chest First Aid at Sea"; and "Guide for Hospital Corpsmen on Sea Duty"	1 ea.
--	-------

The following drugs may or may not be included in the drug list, however, if included, instructions were given in Operations Regulation #67.

Aluminum Hydroxide tablets	1" and 3" adhesive tape
Boric Acid powder	One-yard 4 1/4" gauze or
Carbon Tetrachloride	Five-yard 4 1/2" gauze
Epinephrine Chloride	White enamel irrigator
Methenamine tablets	Clinical thermometers reduced to one
V.D. Prophylactic Kit	oral and one rectal
Whitefield's Ointment	Water-proof sheet
	Mosquito netting

The following drugs should be included in the drug list and placed on ships only if they carry a ship's surgeon or a hospital corpsman who is a graduate of the Hospital Corps School, U.S. Maritime Service Training Station, Sheepshead Bay, New York.

Penicillin	200,000 units
------------	---------------

REMARKS: Instructions for the administration of this drug have been included in the training of hospital corpsmen at the Hospital Corps School. Specific instructions regarding the administration will be forwarded under separate cover.



# Vaccine

REMARKS: A sufficient amount of vaccine should be placed on each ship to give each member of the crew basic immunizations against smallpox, typhus, and typhoid; also, for yellow fever and cholera, the latter two immunizations should be given depending upon the ports of call.

---

CAUTION: Medicine should not be given from any bottle if the label has been lost or marred. If the bottle is not clearly labelled, contents should be thrown away.

---

NOTE: The amount of medications on this list are considered as that amount needed for a crew of 75 men for a voyage of three months. It may be necessary, at times, when purchasing medications to change the unit per se in order to purchase the maximum quantity of the drugs called for.

---

W. G. Terwilliger  
W. G. Terwilliger  
Deputy Medical Director

APPROVED:

(Sgd.) JUSTIN K. FULLER  
Medical Director





GUIDE FOR HOSPITAL CORPSMEN ON SEA DUTY

**INTRODUCTION:** The founding of the Hospital Corps School at Sheephead Bay opened up a new era in the training program of War Shipping Administration. It is the first time in the history of the Maritime Service that there have been persons trained medically in this capacity. The purpose of the training was to make available to all members aboard ships operating under War Shipping Administration, medical-care, advice, and also to supervise the sanitation of ships. In addition, to the technical training these men receive, they are given a definite standing which is honored by the U.S. Navy, by various compensation boards in the different states, and in many branches of industrial medicine.

**CONDUCT ABOARD SHIP:** A Hospital Corpsman's most important duty is his work aboard ship. The success or failure of such a duty does not depend alone upon the Hospital Corpsman's ability, but, it is also directly related to his etiquette, attitude, and conduct aboard ship. When a Hospital Corpsman has conducted himself in such a manner that these three are a credit to him it gives him a definite approach which is always very well received by other officers of the ship and members of the crew.

The first impression ship's personnel receives of a new member is often a lasting one, and many times can be detrimental as well as meritorious and thereby cause unnecessary obstacles; for example: no person on a pier or aboard ship should smoke unless in a special location where signs have been posted, indicating that smoking is permitted. In addition to the extreme fire hazard, it definitely brands him as being careless and indifferent.

As a member of the medical personnel it is most important that a Hospital Corpsman keep his personal appearance clean and tidy at all times. It is also important that he conduct himself in such a manner that he will inspire confidence and will at no time divulge the confidence which must exist between a patient and a member of the medical personnel.

A good medical person never works by the clock, but to the contrary, holds himself ready throughout the twenty-four hours of every day.

**TRADITION OF THE SEA:** For many years past, there has been handed down to us a very fine and cherished tradition of the sea - "A ship is not thought of as a place to work only, but it become part of one's life and interest."

Persons going aboard ships must at all times be willing to fit in and become part of such a plan and must respect at all times the position which goes with the Master of the ship. This goes beyond personalities and is limited only by the great respect and responsibility that all masters of a ship enjoy.

**PATIENTS:** In regard to members of a crew, passengers, troops, patients, and prisoners of war, it must be remembered that these persons are all patients and should never be allowed to enter in any personal equation. The only time





that any person would supersede some other one would depend entirely upon the seriousness of his or her illness or accident.

**ARMY TRANSPORTS:** On troop transports, there is in addition to the usual routine aboard ship, the routine of transporting troops, which is clearly outlined in War Shipping Administration Regulation #58 and Supplement #1 and #2.

**SUPERIOR OFFICERS:** When there is a medical officer present the Hospital Corpsman is to be instructed and guided by the physician's orders and those of the Master. When a medical officer is not present, the Hospital Corpsman is confronted by a more difficult situation due to the lack of guidance from a physician. However, a Hospital Corpsman should never at any time go beyond his own limitations. He is a medically trained attendant and not a physician, therefore his duty aboard ship is purely in an advisory capacity and also that of rendering advanced first-aid. He is a staff officer, not a line officer, and therefore not entitled to issue orders at any time.

**SHORE DUTY:** Many agents operating ships under War Shipping Administration have well established medical departments in their home ports. The Hospital Corpsman becomes a member of this staff. While ashore some of his details are concerned with preemployment medical examinations and sign-on examinations. It is also his duty to check over the medical supplies in his sick bay and to bring these supplies up to date prior to sailing day.

**SAILING DAY:** On sailing day from the home port it is the duty of the Hospital Corpsman to make sure that no member of the crew has signed on who has not had a medical inspection examination. There are a few cases that so happens and they are known as last minute sign-ons or pier head jumpers. Such persons can be found by checking the names on the crew's list against the names on the list of those who have had medical examinations prior to sailing. When such persons are located they should be given medical inspection examinations by the Hospital Corpsman and the physical examination form completed. The Hospital Corpsman should then report his findings to the Ship's Surgeon, or in his absence to the Master, or to both. In checking the two lists mentioned above there is always the second type of person to be found aboard ship, and he is known as a stowaway. The presence of a stowaway should be reported immediately in the same manner and dealt with in the same way as pier head jumpers.

**STRETCHERS CASES:** In regard to patients coming aboard ship, especially stretcher cases, a Hospital Corpsman should familiarize himself with the history of the case and be guided by the instructions given him by the physician of the patient.

**MENTAL PATIENTS:** In regard to mental patients, the Hospital Corpsman should likewise ask for instructions, etc., and he must also be sure that such a case is accompanied by two trained attendants to protect this person not only from harming himself but from harming others aboard ship.





**SICK CALL:** The Hospital Corpsman must hold sick call daily at regular stated times and the hours for the sick call must not only be posted in the sick bay, but it must also be posted on the crew's bulletin board.

**IMMUNIZATIONS:** Due to the limitation of time when a man is assigned to a ship and when that ship sails, and due to the fact, that during this interim each man is given a definite duty, it is physically and mechanically impossible to properly immunize crew members against smallpox, typhoid, and para-typhus (W.S.A. Regulation #19). In order to properly immunize crew members it is necessary to have assigned to each ship when it sails from its home port to such ports, a Pharmacist's Mate, a graduate of W.S.A. Training School, Sheepshead Bay, whose duty will be to conduct, according to time intervals the proper immunizations of all members of that crew after sailing day.

In addition to vaccination against smallpox and immunization for typhoid each member of the crew should have the proper immunization against cholera, or typhus, or both, depending upon the cases reported by U.S. Public Health and on record in foreign ports where the ship will call. Due to the present emergency and rapid spread of cholera and typhus fever it is not only fair, but necessary, to members of crew, for their own protection and safeguard, that they receive proper immunizations. Immunizations of members of the crew can be compiled by reviewing the number and types of immunizations previously given to a crew member, and concerning this - the scheduled ports of calls for the ship on its present voyage should be taken into consideration.

There has been in the past the question of incapacitating crew members and thereby interfering with their duty at sea - such a problem can be alleviated by only inoculating, at a given time, 25% of the crew from different sections, such as the engine room, etc., and to do these inoculations at the beginning of their liberty after they have come off a watch. It is true that there will be a certain number of reactions and possibly a few will be forced to remain off duty, however, this is such a minor number and minor handicap compared with the risk of lives should members of our crew be exposed to cholera, typhus fever, typhoid, or smallpox.

Specific instructions for immunizations are as follows: (see attachment)

The Medical Department of W.S.A. would like to go on record at this time and firmly recommend and insist that all ships sailing to such ports must have aboard a graduate pharmacist's mate from Sheepshead Bay, and that agents must prior to the sailing of the ship supply it with an ample amount of cholera vaccine, typhus vaccine, typhoid vaccine, and smallpox vaccine, supplies of which can be readily obtained through local dispensers in their home ports. In foreign ports this vaccine should be given from our ship's supplies to our agents or representatives in that port upon request, if any of these contagious diseases are present in an epidemic form and such vaccine is not obtainable in those ports.

**PRATIQUE:** In addition to medical care a Hospital Corpsman must help at all time to conform with the sanitation regulations aboard the ship. He should make daily inspections with a representative appointed by the Master of the ship, and he should then report his findings and suggestions only in an advisory capacity - he should not issue orders.





He should familiarize himself in regard to communicable diseases by reading the pamphlet published by U.S. Public Health Service entitled "Control of Communicable Diseases", reprint #1697. These reprints will be available aboard every ship operating under W.S.A. They can be obtained by a direct request to the U.S. Public Health Service station in the home port.

When a death occurs aboard ship it must be reported immediately to the master of the ship. The Hospital Corpsman should make out a death certificate in triplicate, stating in addition to the information called for on this death certificate, his opinion as to the cause of the death, the longitude and latitude of the ship's location at the time the death occurred. All death certificates should contain clearly written data including the year, the hour, and the ship's location.

Following this the next duty concerned with the death is for the proper disposition of the body, if the body is to be buried at sea, or if it is to be returned and taken ashore. In a foreign port it must be ascertained whether or not there are any local health regulations which would prohibit taking the body ashore. Should such regulations exist and the body is still to be transported then it must be embalmed aboard ship as soon after death as arrangements can be made.

In foreign ports the first duty of a Hospital Corpsman is to have the ship's papers properly prepared and ready to present to the Boarding Officer. He must meet the Boarding Officer at the ship's ladder or at any location where the officer boards the ship, and remain with him until the ship has been qualified and the health rules and regulations satisfied whereby (the ship is cleared). When the Hospital Corpsman is told by the local health authority that his ship is cleared, it is then his duty to report to the officer on the bridge and give him the information that the ship has satisfactorily met the standards - his ship is cleared, and the quarantine flag may be lowered. Should the ship not meet the standards the Hospital Corpsman with the officer on duty, the Master of the ship, and the Boarding Officer must all work together to satisfactorily meet the requirements stipulated by the Port Officer.

Moreover, in foreign ports a Hospital Corpsman must familiarize himself with the health conditions and the prevailing illness in the port. If any quarantinable disease is prevalent a record should be made and reported to the Master of the ship and to the proper officer in the home port on the return of that ship. A more detailed routine has been clearly drawn up in conjunction with the Quarantine Division of the U.S. Public Health Service and copies of these are included in the instructions to follow:

One of the most constructive ways for a Hospital Corpsman familiarizing himself with all ships papers and forms is for him to review the same in the "Form Manual" as Used in Conjunction with SHIPPING ECONOMICS COURSE", W.S.A. Training Organization, U.S. Merchant Marine Academy. A copy of this manual will be placed aboard every ship for the use of Hospital Corpsmen.

In foreign ports the Hospital Corpsman should familiarize himself with what hospitals the agents use in that port and he should visit these hospitals and inquire whether or not there are any patients left from other ships operating under this same agent, and if so, whether or not, the patient is fully enough recovered, according to the doctor's judgment in charge, to be taken aboard the ship to return to the home port.





In foreign ports a Hospital Corpsman must never go on liberty without permission of the Master, and certainly never go on liberty if the ship is working cargo, nor should he go on liberty in a foreign port unless there is available emergency care should accidents occur to members of the crew or stevedores while the ship is working cargo. After liberty in a foreign port the Hospital Corpsman must return to his ship not later than two hours prior to the stated sailing time.

On the return voyage the Hospital Corpsman must be sure that all medical and accident reports are up to date and complete, that the ship's papers are accurate and complete, that he has properly drawn up requisitions for his supplies for the subsequent voyage, whether or not he will sail that ship he must bring his sick bay supplies up to date. Moreover, he should have a copy of the crew's list and on it recorded the results of medical inspection of those members of the crew who plan to make a subsequent voyage. Such examinations to be done within 18 hours from the expected time of arrival in the home port.

When a member of the crew disqualifies, the Hospital Corpsman should record his recommendations, advise the member and provide for him to receive the proper follow-up care on his return to the home port. Once the members of the crew have been certified from a medical point of view, the Hospital Corpsman should then prepare to qualify his ship for entry into the home port. Such procedures to include the mechanical cleaning of the ship, etc. Detailed instructions are attached:

**ENTRY PAPERS AND PROCEDURE:** Entry procedure is much more difficult and involved than clearance. This of course is due to the control and protection our government exercises under the law for the general well-being of the nation. Three things arising out of international commerce are important to every country. First, is protection against importation of disease from abroad - this protection is administered by the U.S. Public Health Service, a sub-division of the Federal Security Agency, and the U.S. Department of Agriculture. Second, is the protection against illegal entry of goods contrary to tariff or customs regulations - this protection is administered by U.S. Customs, a sub-division of the Treasury Department. Third, is the control of nationals of other countries entering the United States in excess of established immigration quotas - this control is administered by the Immigration Department, a sub-division of the Department of Labor.

When the vessel arrives at the first United States port the initial stop will be made at the quarantine station except in the case of Radio Pratique. At this station the right of precedence in boarding the vessel is given to the surgeon of the United States Public Health Service.

**QUARANTINE FORMS:** The Quarantine Declaration (Form 24), is a summary of all the health aspects of the vessel and voyage. It is signed by the master and completed by the boarding surgeon. The data requested covers the voyage in general, the kinds of cargo carried, number of passengers and crew on board, stowaways, number of cases of illness on board during the voyage and the date and type of fumigation certificate on board. This last-named certificate must be presented as proof that the vessel has been fumigated as required by law. When a vessel is ordered by the Public Health Service to be fumigated either because of signs of vermin or as a precaution, the procedure is as set forth under Preparing a Vessel for Fumigation (Form 25).





After being fumigated the Deratization Certificate (Form 26) is issued and as stated thereon records the inspection and deratization at the particular port on the said date. If upon entry the vessel is in good sanitary condition and has a recent deratization certificate, fumigation will not be required and a Deratization Exemption Certificate (Form 27), will be given. These certificates should not be taken off the ship.

The duplicate of the Bill of Health (Form 23), obtained from consuls at the various foreign ports touched, should be presented to the Public Health boarding official. The original is kept for presentation at the custom house.

No vessel can enter a port of the United States which has on board any meat which was acquired in regions where the foot and mouth disease exists. In connection with the regulation the master must make a declaration of the source of all livestock and meat aboard, whether alive or in sea stores. This statement is called the Shipmaster's Declaration (Form 28), and is sworn to by the Master before the Public Health Quarantine Officer.

New York and many other coastal states do not allow parrots to be imported because they transmit a very contagious disease. A declaration must be made by the master to the Public Health Service if any such birds are aboard. Birds may be authorized to enter if they are directly transported outside the State of New York. The form used is known as the Declaration of Birds of the Psittacine Family (Form 29). There are also restriction on certain animals.

SANITARY LOG FOR VESSELS: (See attachment.)

Upon arrival date in the home port a Hospital Corpsman's duty has not ended until all members of the crew have signed off and the ship has conformed with the rules and regulations of pratique as set forth by the U.S. Public Health Service. When this is finished and completed his duties aboard ship have been finished and he is to then report to a representative of the medical department of the Agent or any other person designated by the company. At this time he is to take with him all of his reports, requisitions, etc., and give a detailed account of the voyage, following which, he will await further instructions and assignment.

William G. Terwilliger  
Commander (MC) USNR  
Deputy Medical Director  
Division of Operations, WSA

attachments: 5





96

PLAN FOR DISINFESTATION OF SHIPS  
OPERATING UNDER W. S. A.

The Army Transport Division has cooperated at all times, and at the meeting held on October 9, it volunteered to notify the Quarantine Division of the Public Health Service, Port of New York, when a ship operating under War Shipping Administration and transporting infested prisoners of war that the Army would be responsible to inform the Quarantine Division when that ship would dock and where, in order that representatives from the Public Health Department could make a proper inspection of that ship, after it had been cleaned mechanically according to the following plan.

It was agreed at the meeting that after the Army had disembarked all prisoners of war it was then the responsibility of the agents operating the ship under War Shipping Administration to mechanically clean the ship in preparation for subsequent voyage. The mechanics of procedure was to be done in cooperation with the rules and regulations and standards outlined by the U.S. Public Health Division which are as follows:

1. Vessels arriving at United States ports with prisoners of war shall be considered under Quarantine restrictions until the following procedures have been completed:
  - (a) All prisoners - their clothing, blankets and personal effects are discharged. All cleaning up of ships prior to arrival in Port of New York should be done by prisoners. That is, they should collect together all personal effects, things used by them on the voyage, such as discarded clothing, etc., and when they embark all such personal effects should be taken with them.
  - (b) The quarters utilized by the prisoners of war have been mechanically or otherwise deloused and thoroughly cleansed.
2. The delousing of prisoners, their bedding, clothing and personal effects shall be a responsibility of and accomplished by the U.S. Army or Navy according to their respective jurisdiction.
3. Vessels carrying prisoners of war such as troop transports which are a part of the armed forces or vessels operated continually under the jurisdiction of the Armed Forces shall be mechanically cleansed by the service having operating jurisdiction.
4. Vessels which have discharged prisoners of war and have been returned to the operating jurisdiction of the War Shipping Administration or private agencies shall be mechanically cleansed by the controlling agency.





5. Vessels discharging prisoners of war and proceeding immediately to a final United States port of destination, may postpone mechanical cleansing or fumigation until arrival at such final port.
6. The mechanical cleansing of compartments which have recently been utilized by prisoners of war shall be accomplished in sequence as follows:
  - (a) All dirt, rubbish and waste products shall be removed to an incinerator.
  - (b) The floors shall be thoroughly swept.
  - (c) Floors, walls, bunk frames, stanchions, etc., shall be thoroughly washed down and scrubbed with soap and water.
  - (d) Floors or deck shall be finally washed with creosol solution, minimum strength 1% - lysol in 1% solution - liquor cresolis compositus solution 1%, or a Creolin solution of 2% strength. When the representatives of the U.S. Public Health Division recommend to the private agents or to fumigation companies chemicals to be used they should give instructions as to the strength of such solutions, what they want used as a base, etc. That is, oils used as base are dangerous fire hazards. Aqueous solutions as base are almost as efficient and much less dangerous. Carb-oxide is also very dangerous as an explosive and therefore should not be ordered. Various solutions of creosol are almost impossible to be purchased on the market today and therefore should not be recommended. Pyrethium cannot be purchased today on the market and should therefore not be ordered.
7. The United States Public Health Service will inspect compartments and furnishings recently utilized by prisoners of war on all vessels operated by the War Shipping Administration and private agencies. When evidence of live louse infestation is found, they will take such precautions in the way of fumigations as are indicated.
8. When a vessel has completed discharge of prisoners of war and has been mechanically cleansed by the operating agency having jurisdiction (Army, Navy, WSA, or private operators) certification of such mechanical cleansing shall be made to the U.S.P.H.S. at the local quarantine station on a suitable form.
9. In order that the U.S. Public Health Service may properly carry out its functions in the way of making necessary sanitary inspections and forming such fumigations as may





be indicated on vessels carrying prisoners of war, it will be necessary for the various Governmental and private agencies concerned to inform the local quarantine station of the arrival of vessels carrying prisoners of war and the location of the dock at which they are to be berthed subsequent to the discharge of prisoners. Furthermore, it was agreed unanimously at the meeting that after prisoners had disembarked from an infested ship it would then be the duty of War Shipping Administration to mechanically clean that ship according to the foregoing proposed plan and upon completion of this cleaning they would then notify the Quarantine Division of the U.S. Public Health that such ship had been cleaned and was now ready for inspection by them in order to qualify the ship for a subsequent voyage, and thereby release the ship for immediate use and assignment.

*William G. Terwilliger*  
William G. Terwilliger  
Commander (MC) USNR  
Deputy Medical Director  
Division of Operations



99

Federal Security Agency  
U. S. PUBLIC HEALTH SERVICE  
Washington  
(Bethesda Station)

April 26, 1943

Unnumbered Circular

To: Officers and Employees Concerned

Subject: Vaccination Procedures

To promote uniformity in vaccination procedures as employed by Public Health Service personnel, the following should be used as a guide:

Disease	Indications (When to be given)	Standard Course	Duration of immunity	Revaccinations
Smallpox	Advised for all infants before 3 months of age. Should be required shortly before entrance to school and certain employments and before foreign travel.	1 dose, pressure method; 30 pressure with the side of the needle point within a 3 mm. area at the left deltoid insertion.	1-5 years	At least every 5 years and at any time interval when there is danger of exposure. For some groups of personnel, as in the Public Health Service, a general vaccination every 5 years is the most efficient procedure.
Typhoid	Advised only for conditions where sanitation is uncertain, not for usual city dwellers; also for most foreign travel. Military requirement with paratyphoid mixture.	3 doses consisting of $\frac{1}{2}$ cc., 1 cc. and 1 cc., subcutaneously at 7 to 10 day intervals.	3 months to 3 years. Not a dependable immunity.	Standard course after 3-year interval; stimulating dose consisting of 0.1 cc. intradermally or 1 cc. subcutaneously after interval of 1-3 years following standard course. Army recognizes only subcutaneous method.





Disease	Indications (When to be given)	Standard Course	Duration of immunity	Revaccinations
Yellow Fever	For travellers to yellow fever danger zones as defined by Surgeon General; at present immunization of infants under 1 year not recommended.	1 dose of $\frac{1}{2}$ cc. subcutaneously.	Solid immunity for 2-4 years if vaccine is fully potent.	At least every 4 years for persons entering or passing thru a yellow fever area, and at least every 2 years for persons (especially children) residing in an epidemic area.
Tetanus	For those exposed to the danger of piercing or crushing wounds, such as military personnel; providing they are permanently tagged so that toxoid instead of antitoxin will be given in case of injury.	Alum Precipitated Toxoid (Navy method): 2 doses, either 1 cc. or $\frac{1}{2}$ cc. as indicated on the package, subcutaneously, about 4 weeks apart.	5-10 years if reinjected at time of injury.	Stimulating dose of 1 cc. or $\frac{1}{2}$ cc. at time of injury and in any case 1 year after first dose. Also booster dose of 1 cc. or $\frac{1}{2}$ cc. every 5 years.
		Plain Toxoid (Army method): 3 doses of 1 cc., subcutaneously, 3 to 4 weeks apart.	5-10 years if reinjected at time of injury.	Stimulating dose of 1 cc. after 1 year interval or at any time after 6-month interval when there is special danger of exposure, also at time of injury.
Epidemic (louse-borne) Typhus	For travellers into special areas designated by the military authorities, or by public health officials.	3 doses of 1 cc. each subcutaneously at 7-10 day intervals.	Uncertain	Stimulating doses of 1 cc. subcutaneously after 4-to 6-month intervals as long as serious danger of typhus is present.
Cholera	For travellers into special areas designated by the military authorities, or by public health officials.	2 doses of $\frac{1}{2}$ cc. and 1 cc., subcutaneously, with 7 to 10 day interval. A third dose of 1 cc. is advisable.	Uncertain	Stimulating doses of 1 cc. subcutaneously at 4-6 month intervals as long as serious danger of cholera is present.



Disease	Indications (When to be given)	Standard Course	Duration of immunity	Revaccinations
Plague	For travellers into special areas designated by the military authorities or by public health officials.	2 doses of $\frac{1}{2}$ cc. and 1 cc. subcutaneously with 7 to 10 day interval. A third dose of 1 cc. is advisable.	Uncertain	Stimulating doses of 1 cc. subcutaneously at 4 to 6 month intervals as long as danger of plague is present.
Diphtheria	Advised for all children by 6 months of age.	Alum Precipitated Toxoid; 2 doses (1 cc. or $\frac{1}{2}$ cc. as indicated on package) about 4 weeks apart, subcutaneously. Plain Toxoid: 3 doses of $\frac{1}{2}$ cc., 1 cc., and 1 cc., subcutaneously, about 3 weeks apart	About 5 years, assisted by stimulation such as association with urban population where diphtheria carriers are numerous.	Another dose advisable on entering school.

Respectfully,

THOMAS PARRAN

Surgeon General

HGE:bh

(40236)





102

Instructions to Chief Officers of vessels for making entries  
in the ship section of the Sanitary Log

General Instructions --

Quarantine procedures may cause delay, expense and inconvenience. Maintenance of high standards of sanitation will minimize or obviate such unfavorable conditions and facilitate commerce. Elimination of insanitary conditions and active cooperation of masters and chief officers in keeping the Sanitary Log will aid greatly in lessening quarantine restrictions.

The Sanitary Log is an official Governmental record of the sanitary history of a vessel and must be retained on board and available at all times for inspection by authorized public health officials.

The care and maintenance of the Sanitary Log is a responsibility of the Chief Officer under the general supervision of the master.

Entries should be brief and should record the measures taken to meet the recommendations appearing in the Public Health Service section on the opposite page of the Log.

On vessels engaged in foreign trade entries should be completed prior to the vessels next return to a United States port. On vessels exclusively engaged in coastwise or intercoastal trade, entries should be made within the 60 day period following the last official sanitary inspection. All entries are to be confined to the ship section of the Log and opposite to the last completed Public Health Service section. If additional space is required the back of the page may be used. Pertinent rather than frequent entries are desired, these being written before completion of a round trip voyage.

When a Chief Officer is relieved from a vessel after entries have been made, subsequent entries should be dated and initialed by his successor.

When all the Chief Officer's entries are completed the Master's approval should be indicated by signature. When the Master does not approve of the measures taken to secure and maintain satisfactory sanitary conditions on the vessel, a suitable notation should be made to that effect.

1. Rat Elimination Measures.-- Under this heading there should be entered the steps taken to comply with the suggestions made by the Sanitary Inspector. Examples of acceptable entries are as follows:

Voyage No. 146 --

- a. Two dozen snap traps of approved type purchased and received on board.
- b. Trapping instituted during voyage; 4 rats caught in Holds #1 and 2.
- c. Forepeak cleared of dunnage and excess gear properly stored.
- d. Vessel fumigated in London, 12-15-42.
- e. No evidence of rats during voyage.



- 103
- f. Ratproofing of provision storeroom completed.
  - g. Ratproofing maintained
  - h. Defects in Ratproofing of engine room sheathing repaired.

2. Measures taken to maintain sanitation or correct insanitary conditions. Under this heading should be entered the steps taken to meet the recommendations for improving sanitation.

(Sample entries)

- A. Sanitation maintained
- B. Cockroach control maintained in Galley and Pantry by insect powder.
- C. Bedbug spray applied to bedding and beds in crew's quarters, forward.
- D. No verminous infestation of crew or quarters discovered during voyage.
- E. New metal garbage cans with covers provided for use in galley and pantry; cans kept covered
- F. All insanitary conditions reported by Sanitary Inspector corrected.
- G. Containers for waste food, trash, etc. provided in crew's quarters
- H. Holds cleaned after discharge of cargo and dunnage racked





Instructions to Inspectors of the U.S. Public Health Service for making entries in the sanitation section of the Sanitary Log.

(NOTE It is recommended that quarantine officers, sanitary inspectors and others read the following article.

Sherrard, G. C. : A Sanitary Log for American Ships; description and plan of operation. Pub. Health Rep., 55, 47, 2167, November 22, 1940.)

-----

Purpose of Log.- To provide quarantine officers, sanitary inspectors, ships officers, agents, owners and others with cumulative information regarding the sanitary history of vessels through systematically recorded reports of previous inspections.

The data will assist quarantine officers in classifying vessels as to quarantinable disease potentialities. Maritime interests will be able to ascertain the degree of emphasis placed upon ship sanitation by their employees.

General instructions.- The entries in the sanitation section of the Log are to be recorded legibly in ink by a sanitary inspector of the U. S. Public Health Service after a complete inspection has been made. When a vessel with residue cargo is remanded to another United States Port, the entries in the Log should be recorded at the port in which the vessel is empty or has the least amount of cargo.

Vessels from ports in which plague or other quarantinable diseases in epidemic form are not present, or are not suspected of being present, should be inspected at intervals of not more than 90 days and appropriate notations made in the Log.

Vessels from ports in which quarantinable disease is present or is suspected of being present must be inspected after each voyage and appropriate notations made in the Log.

Entries should be made after each item in conformity with the following instructions:

1. NO \_\_\_\_\_: The pages of the Log for each vessel should be numbered consecutively, beginning with 1. The purpose of the consecutively numbered sheets is to reveal the absence and indicate the approximate date of a report missing from the binder. The number of the sheet in the Log should be recorded on Rat Infestation Inspection form 1976. Absence of a sheet from the binder should be reported to the Medical Officer in Charge of the Quarantine Station concerned.

2. Nat \_\_\_\_\_ S \_\_\_\_\_ Chief Officer \_\_\_\_\_  
The nationality and name of the vessel should be inserted; the name and initials of the chief officer should be given. When a chief officer is replaced, the name of his successor should be entered.

3. FROM \_\_\_\_\_: For cargo vessels name the primary loading port; for vessels engaged primarily in transporting passengers, name the port where passengers first embarked.





4. INSPECTED AT PORT OF- Name of port at which current inspection was made.

5. DATE- Date of current inspection.

6. RAT INFESTATION, EXTENT- Estimated extent of rat infestation in terms of; 1, "slight", five rats or less; 2, "moderate", between 5 and 15 rats; and 3, "marked", more than 15 rats.

7. LOCATION- Give location of rats according to section of vessel, as outlined in deratization certificate (Form No. 1938).

8. ELIMINATIVE MEASURES IN FORCE- State whether trapping, cleaning, poisoning, maintained ratproofing or other measures are employed; whether such measures are applied by ship's crew or commercial exterminators are employed.

9, 10, 11. NO. TRAPS SET- Record the number of traps baited and properly set, total number of usable traps on board and the kind of trap, whether snap, cage or other.

12. SANITATION- General condition: State the general sanitary condition of the vessel in terms of "good", "fair", or "poor". The presence of rats precludes a favorable report on sanitation unless the infestation is confined to an isolated and little used compartment, in which instance the exception must be clearly stated.

13. INSANITARY CONDITIONS: KIND AND LOCATION - State the nature of insanitary conditions noted, such as dirt, grease, trash, excessive and improperly stowed dunnage, infestation by vermin, etc. The location of the insanitary conditions should be noted by section and compartment.

14. RECOMMENDATIONS- The measures recommended for the correction of insanitary conditions should be briefly but definitely stated. Recommended measures should include elimination of harborages, blocking of rat runs, cleaning, proper stowage of dunnage and supplies, protection of foodstuffs, trapping of rats, elimination of vermin infestation, designation of sanitary officers from the ship's crew or shore personnel and such other measures as may be indicated.

15. DATE AND PLACE OF LAST DERATIZATION OR EXEMPTION CERTIFICATE- Cross out the words on the certificate that do not apply; state the date and place in which the last certificate was issued.

Service fumigations should be noted under the appropriate heading, the name of the port, the date and the number of rats killed being stated. When the space provided for such entries has been previously filled, a similar entry should be made under "Remarks". Such entries should be authenticated by the signature and title of the person making the record.

16. REMARKS- State whether the cooperation afforded by the chief officer, ship's crew and shore personnel has been satisfactory, whether previous insanitary conditions have been corrected; and give any other information that may be useful to quarantine officers and sanitary inspectors.





Modified Quarantine for Tankers at Port of New York.

Definition: Modified Quarantine is the procedure whereby an eligible Tanker may proceed to its dock or anchorage without stopping for routine quarantine inspection.

Purpose: To expedite entry and turn-around of certain tankers from foreign ports.

Period of Operation: For duration of war unless sooner abrogated.

Vessels Included: Tankers only.

Port of Operation: New York only.

Foreign Ports Included: United Kingdom, Greenland, Iceland, Newfoundland, Curacao, Aruba, Caripito and clean ports in the immediate vicinity of those named.

Foreign Ports Excluded: Ports in which quarantinable diseases are present or suspected of being present. Tankers from such ports must undergo routine quarantine inspection.

Participation Optional: Participation in this plan is optional; Tankers may at any time stop for routine quarantine inspection even when eligible for modified quarantine. However, arrangements for modified quarantine must be made prior to departure for a foreign port.

- - - - -

Modified Quarantine Consist of the Following Steps:

1. An application from the owners, operators or agents of the tanker for permission to enter the port of New York without stopping for routine quarantine inspection. (Form 1)
2. Written permission from the Chief Quarantine Officer to enter the port under modified quarantine and setting forth the rules and regulations governing the procedure.
3. A certificate in prescribed form submitted by the Master of the Vessel immediately after arrival in port. (Form 2)

Special Note. - Forms 1 and 2 not being available from the Public Health Service, must be printed, typed or otherwise duplicated by the participating Company.



(Form 1.)

Step 1. Application Form to be used by Owners, Operators or Agents of Tankers in obtaining Modified Quarantine:

\_\_\_\_\_ 194  
(Place and Date)

The Chief Quarantine Officer  
U.S. Quarantine Station, Rosebank,  
Staten Island 5, New York.

Sir:

It is requested that the Tanker \_\_\_\_\_  
(Nationality and Name of Vessel)  
be considered for Modified Quarantine. The Vessel usually operated between New  
York and \_\_\_\_\_  
(Names of Foreign Ports)

The Vessel is continually maintained in a clean and sanitary condition and  
is believed to be Rat-Free.

The Master of the Vessel has read the accompanying instructions governing  
Modified Quarantine, understands them and agrees to comply with them to the best  
of his ability. When in doubt he will fly the Quarantine Flag upon entering port,  
drop anchor and await an inspection by the Quarantine Officer.

(Signed) \_\_\_\_\_  
(Owner, Operator or Agent)

By \_\_\_\_\_  
(Name and Capacity)

Signature of Ship's Master

\_\_\_\_\_  
(Master)

-----  
Applications for the establishment of eligibility for modified quarantine  
and all questions relating thereto shall be addressed to the Chief Quarantine  
Officer in writing and shall be answered in the same manner. Interpretations,  
rulings and opinions will likewise be rendered only in writing.

Step 2. Confirmation by the Chief Quarantine Officer as to eligibility of a  
Tanker to enter port under Modified Quarantine.





In response to the application for Modified Quarantine the Chief Quarantine Officer will, if approved, authorize the Vessel to enter port in accordance with the rules and regulations.

General Information.

Modified Quarantine places considerable responsibility upon the Master of a Tanker and his Officers. Not more than 12 hours before reaching port all persons on board shall be inspected for signs of illness. The following symptoms should be regarded as grounds for suspecting the presence of communicable diseases:

1. Fever accompanied by Prostration or Persisting for several days, or attended with Glandular swellings.
2. Any sudden skin rash or eruption with or without fever.
3. Severe diarrhea or diarrhea with symptoms of collapse.
4. Jaundice accompanied by fever.
5. Any other symptoms suggestive of communicable illness.

Limitations of Modified Quarantine.- The procedure known as Modified Quarantine applies solely to the Quarantine requirements of the U.S. Public Health Service and in no wise relieves a Vessel from compliance with the rules and regulations of other Federal Agencies. However, it is expected that Customs, Immigration, Plant Quarantine and Coast Guard Intelligence Officers will arrange to facilitate and expedite qualified Vessels of the Tanker class so that they need not stop in the Quarantine Anchorage.

Coastwise Tankers.- Tankers operating between United States ports are not required to stop for Quarantine Inspection unless suspicious illness has occurred or information and assistance is required, from a Quarantine Officer.

Vessels from foreign ports, undergoing Quarantine Inspection at another United States Port prior to arrival in New York are considered as coastwise in status and are not required to stop for Quarantine Inspection in New York unless diagnosed or suspected communicable disease is present.

Modified Pratique.- Following acceptance by the Chief Quarantine Officer of the certificate, (Form 2) prepared and filed by the Master of a Tanker, a Modified Pratique will be mailed to the agents of the Vessel. This Document, together with the original United States consular bills of Health, is required for Customs entry.

Psittacine Birds not to be carried.- A Tanker is not entitled to Modified Quarantine when Psittacine Birds are carried. Such birds include African Grays, Amazons, Cockatoos, Lories, Lorikeets, Love Birds, Macaws, Mexican Double Heads, Parakeets, Parrots and all similar birds.





Particulars of Modified Quarantine.- All persons concerned with the operation of Tankers under the provisions of Modified Quarantine are informed that no new conditions have been added to the requirements for such entry. The final certificate simply represents the information customarily acquired by the Quarantine Officer when a routine inspection is made and is necessary to the Health Protection of the Port.

Loss of Modified Quarantine Privilege.-

1. Through Violation.- Failure to comply with the rules and regulations governing Modified Quarantine will result in revocation of the privilege. Thereafter the Tanker will not be restored to the eligible list until a new application has been filed, and full compliance with requirements has been assured.

2. Through Disuse.- When Modified Quarantine has not been used for a period of six months, the Tanker will automatically be removed from the eligible list. Before eligibility is restored a new application will be required, observing all formalities for placing the vessel on the Modified Quarantine List.

Requirements for entry under provisions of Modified Quarantine.

1. Permission from Chief Quarantine Officer to utilize this form of entry.
2. Understanding of requirements by Master and Officers of Vessel.
3. Prompt submission of Certificate, stating that -
  - A. There were no deaths during the voyage.
  - B. There were no known or suspected communicable diseases during the voyage.
  - C. All persons were inspected less than 12 hours before reaching port; All appeared free from illness and reported themselves as being well.
  - D. The Sanitary Log recommended by the Public Health Service has been installed and is being maintained.
  - E. The Bureau of Animal Industry form reporting the Quantity and origin of fresh meats from foreign ports has been prepared and accompanies the Certificate.
  - F. A valid deratization certificate or deratization exemption certificate is carried.
  - G. The United States Consular Bills of Health (duplicate copies only) from ports of call accompany the certificate of entry.
  - H. No birds of the Parrott family are carried.





-5-  
(Form 2.)

- I. The names, nationalities and ratings of crew members or passengers known or suspected of having venereal disease appear on a separate sheet and accompany the certificate of entry.
- J. The Vessel is constantly maintained in a clean and sanitary condition and is believed to be rat-free.

Step 3. -

Final Certificate of Modified Quarantine Entry. (Very Important)

(By Special Delivery Mail)

New York, \_\_\_\_\_ 194 .

The Chief Quarantine Officer  
U. S. Quarantine Station  
Rosebank, Staten Island 5, New York

Sir: The \_\_\_\_\_ Tanker \_\_\_\_\_  
(Nationality) (Name)

Arrived in New York on \_\_\_\_\_ From \_\_\_\_\_  
(Date) (Foreign Ports)

With The Following:

Officers and Crew \_\_\_\_\_ Passengers \_\_\_\_\_ Others \_\_\_\_\_

1. There were no deaths during the voyage.
2. There were no known or suspected communicable diseases during the Voyage.
3. All persons were inspected less than 12 hours before reaching port; All appeared free from illness and reported themselves as being well.
4. The Sanitary Log recommended by the Public Health Service has been installed and is being maintained.
5. The Bureau of Animal Industry form reporting the quantity and origin of fresh meats from foreign ports has been prepared and accompanies this certificate.
6. Acceptable (Deratization \_\_\_\_\_) certificate (which?)  
(Deratization Exemption)

Place and Date of issue \_\_\_\_\_



7. United States Consular Bills of Health (Duplicate Copies) from ports of call accompany this certificate.
8. The names, nationalities and ratings of crew members and passengers known or suspected of having venereal disease appear on a separate sheet and accompany this certificate.
9. There are no birds of the parrot family on board.
10. The Vessel is constantly maintained in a clean and sanitary condition.

CERTIFIED CORRECT TO THE BEST OF OUR KNOWLEDGE AND BELIEF:

---

(Hospital Corpsman, if present)

---

(Ship's Master)





CERTIFICATE FOR VESSELS OF THE U. S. ARMY, NAVY, COAST GUARD AND COMPARABLE  
VESSELS OF ALLIED NATIONS. ONE COPY ONLY IS REQUIRED AND IS TO BE DISPATCHED  
BY MAIL IMMEDIATELY AFTER ARRIVAL IN PORT TO THE QUARANTINE OFFICER.

\*\*\*\*\*

112

Name of Vessel \_\_\_\_\_

Date of Arrival \_\_\_\_\_

Port \_\_\_\_\_

Medical Officer in Charge  
U. S. Quarantine Station

THIS IS TO CERTIFY THAT:

1. The sanitary condition of the vessel is satisfactory and there has been no quarantinable or other communicable disease during the present voyage.
- OR 1. The sanitary condition of the vessel will be satisfactory when the \_\_\_\_\_ compartments utilized for quarters by potentially (specify area) louse-infested personnel have been mechanically or otherwise deloused.
2. No psittacine birds (including African Grays, Amazons, Cockatoos, Lories, Lorikeets, Love Birds, Macaws, Mexican Double Heads, Parakeets, Parrots, or similar birds) will be landed.
3. The vessel has not visited foreign ports known or suspected of being infected with cholera, plague, epidemic typhus fever, smallpox or yellow fever.
- OR 3. The vessel has visited foreign ports known or suspected of being infected with cholera, plague, epidemic typhus fever, smallpox or yellow fever, but has held no communication which was liable to convey infection.
- OR 3. Communicable disease other than quarantinable has occurred during the present voyage but is under control. Active cases have been reported to the local civil health authorities upon arrival in port.
4. The vessel is believed to be free of rats and is not in need of an infestation inspection or fumigation by the U. S. Public Health Service.
- OR 4. Evidence of rat infestation has been noted and an inspection by the U. S. Public Health Service is requested with a view to instituting corrective measures.
5. Duplicate copies of United States Bills of Health are forwarded herewith.
- OR 5. United States Bills of Health are not available.

Signature \_\_\_\_\_

Title \_\_\_\_\_  
(A Medical Officer of the U.S.)



I hereby certify that the measures prescribed by the U. S. Public Health Service for the mechanical cleansing and disinfection of the

\_\_\_\_\_ S/S \_\_\_\_\_  
(Flag) (Name of Vessel)

have been completed and that the vessel is now in a clean and sanitary condition.

\_\_\_\_\_  
(Title of person signing)

(Specify which) For U. S. Army or  
U. S. Navy or  
War Shipping Administration or  
Private Agency





114

UNITED STATES COAST GUARD

Boston, Massachusetts

"Use of Sodium Fluoride for the  
Control of Cockroaches"

1. "Sodium Fluoride when properly applied is one of the best insecticides for the control of cockroaches.
2. "Vessels infested with cockroaches should be treated in sections, starting with the most heavily infested points such as the galley and pantry. These sections should be thoroughly washed with soap and water, first removing stores and utensils from all shelves and drawers. After cleaning, sodium fluoride should be laid in a thin line along the inside of all shelves and drawers and the floors where the edges of shelves, drawers and floors meets the perpendicular bulkhead or edge. Small openings for pipes and wires should be treated in a similar manner. This insecticide should not be scattered over the floor or on shelves or in drawers, nor should its use be attempted while stores or equipment or food supplies are in place as it is a deadly poison and every precaution must be taken to prevent it from being mixed with food. The natural color of Sodium Fluoride is white whereas the Sodium Fluoride insecticide is colored green and comes in perforated top cans. Sodium Fluoride in its natural color, because of its poisonous nature and its resemblance to flour or baking soda, should not be used as an insecticide. When ordering a supply of this item, Sodium Fluoride insecticide, colored green, in perforated top cans, should be specified.
3. "The cockroach feeds with its feet and when emerging from cracks crosses the Sodium Fluoride which it picks up and is thereby destroyed. It becomes important, therefore, that this insecticide be removed after a week or two and a new application made in the same manner as above described. This is necessary in view of the fact that the Sodium Fluoride tends to harden after being laid for a short time and the cockroach will not pick it up, thereby escaping destruction.
4. "If a vessel is heavily infested throughout with cockroaches and availability will permit, fumigation with Hydrocyanic Acid gas should be requested. It should be kept in mind however that fumigation does not destroy the cockroach eggs and later on, if no steps are taken to control infestation, the vessel will again become infested with cockroaches. Fumigation, therefore, affords only temporary relief whereas cleanliness and the occasional use of sodium fluoride as described, particularly at the first signs of cockroaches will enable personnel to keep their vessel entirely free from these pests.
5. "Cockroaches are brought aboard vessels in ships' stores, laundry, etc., and unless control procedures are in effect on board, any vessel may eventually become infested with cockroaches."

/s/ T. L. Tully,  
Administrative Assistant  
Fumigation Officer



105 A  
UNITED STATES COAST GUARD

Boston, Mass.

DISTRICT COAST GUARD OFFICER  
CUSTOMHOUSE  
BOSTON, MASS

And refer to file No. m-423

11 December, 1943

To: Commanding Officer, \_\_\_\_\_

Subj: Instructions to Units desiring fumigation.

1. Contact Mr. Tully, (50 Central Wharf), Liberty 4589, 2 to 3 days before day desiring fumigation, and he will arrange a date for fumigation. This should be followed by an Official Letter, requesting fumigation and stating that you will replace gas used. The reason for fumigation and instructions for fumigation will be carried out.

2. Gas for actual fumigation will be furnished by Quarantine at time of fumigation. You will replace the amount used by them.

TO PREPARE VESSEL FOR FUMIGATION.

(a) Have cubic capacities of all parts of the vessel to be fumigated available for fumigation officer upon his arrival. Cubic feet shall be grain capacity.

(b) Crew of vessel shall be very carefully accounted for, and be ready to leave ship upon arrival of fumigators. Crew to be prepared to vacate ship for 24 hours.

(c) If vessel is a freighter, remove ALL hatch covers from between deck hatches wherever such covers are not covered with cargo.

(d) If vessel has outside hatches to holds, remove every other hatch cover from main deck and bunker hatches and place all such covers removed on the deck. DO NOT place covers on top of other covers on the hatch. Cover hatches with two serviceable tarpaulins and wedge tightly on three sides of hatch. Have plenty of extra wedges by each hatch.

(e) Cover securely all ventilators leading into spaces to be fumigated.

(f) If vessel is a Coal Burner, doors from fireroom to bunkers should be securely closed and if tight should be pasted using newspaper with flour and water paste.

(g) See that all ports can be opened readily and then close securely on one side.







(i) If vessel is a freighter and free of cargo, dunnage shall be removed in all holds in order to permit gas to get into bilges.

(j) If vessel is a freighter, dunnage in forepeak and poop spaces shall be spread out in such manner as to permit gas to circulate freely in such spaces. If the dunnage is piled too thick to permit free circulation of gas it may become necessary to remove such dunnage to the open deck.

115B

115B



(k) If electric current is not available on the vessel for the fumigators, provide current through an extension cable (AC or DC-110 volts).

(l) The cooperation of ships officers in accomplishing the above work prior to the arrival of the fumigation officer is earnestly requested in order that many hours of time may be saved the vessel requiring fumigation.

(m) Guard to be posted on gangway to prevent access to vessel during fumigation.

(n) Arrangements made for airing mattresses, pillows and blankets for two hours in the open following fumigation. Such bedding must be aired before use. This requirement is very important.

---

DISTRICT MEDICAL OFFICER





111

Address reply to  
DISTRICT COAST GUARD OFFICER  
CUSTOM HOUSE  
BOSTON, MASS  
And refer to file No. m-423

17 December, 1943

MEMORANDUM FOR MEDICAL OFFICERS AND PHARMACIST'S MATES, 1ND

Subj: Requisition for Medical Supplies from Navy Medical Supply Depot  
on form MMS-4; preparation of.

1. Original and two (2) copies are sent to DCGO who will send original to MMSD, one (1) copy to Headquarters, and retain one copy for file.
2. Each unit is limited to two (2) requisitions annually. Special requisition may be submitted in an emergency for items of truly emergent character whose need could not have reasonably been foreseen.
3. Units having both medical and dental facilities shall submit consolidated requisition to cover the requirements of both.
4. Items of Class 7 and Class 8 are not to be requisitioned on form MMS-4. They will be obtained from Coast Guard as heretofore.
5. Whenever it becomes necessary for any unit to replenish its stock of routinely used items to last out a six months period, the material if available, will be furnished by District Coast Guard Medical Supply Unit upon receipt of properly prepared form NCG-2556, original and three (3) copies. The foregoing is not to be interpreted as relaxing the necessity of making a reasonably accurate estimate of anticipated requirements for a six (6) months period.
6. All classes of items as listed in the Naval Medical Supply Catalog may be included in a single requisition. Separate requisitions are no longer required for Supplementary Items, Biologicals etc. No item will be requisitioned that is not listed in MMSD Catalog.
7. Items listed in catalog changes as being temporarily discontinued are not to be requisitioned. These items should be so marked in catalog as to avoid including them on requisition. Also, supplementary class items preceded by letter "X" in status column are not to be requisitioned.
8. The following instructions are to be observed:
  - (a) Enter official name of the requisitioning unit, date, mail address, etc.
  - (b) Spaces for information which does not apply to Coast Guard, such as allotment number, total allotment, etc., should be left blank.



numbered consecutively, beginning with 1.

(d) Stock No. \_\_\_\_\_. The stock number of each item, as indicated by the Supply Catalog shall be entered in this column on the same line on which the name of the item begins. Items and stock numbers shall be arranged in the exact order in which they appear in the Supply Catalog. The stock class number and name shall be typed at the head of each class of items requested. Two blank spaces shall be left between each class of items.

(e) Item: \_\_\_\_\_. List each item requested, beginning on the same line with the stock number, exactly as listed in the Supply Catalog, except that information contained in parenthesis may be omitted. Indicate the electric current on which electrical apparatus will be required to operate, stating the voltage and type of current (A.C. or D.C.). If alternating current, state also cycles and phase. (Example) (110-v., D.C.; 220-v., D.C.; 110-v., 60 cy., 1-ph). When replacement parts, or accessories, for X-ray, electrically operated, or other equipment is required, and adequate description of the part, and of the equipment item for which the part is required, or with which the accessories are to be used, shall be stated, including the make, model, serial number, part number, or such description as may be available, including electric current data, when indicated, in order to enable the procuring medical supply depot to accurately indentify the material required.

(f) Unit: \_\_\_\_\_. Enter on the same line with the stock number and the first line of the item description, the "Unit of quantity" as stated in the Supply Catalog. "One," "Pair," "Dozen," "Pkg.," "100-gm. bot.," etc.

(g) In the column headed "Minimum Stock" on MFS-Form 4, this should be lined out and the heading "on order not received" substituted therefor, accordingly, should additional stock of any item be requested over and above that which was previously requisitioned and back ordered by the Navy, it is necessary that the quantities so back ordered be reported in this particular column.

(h) Required: \_\_\_\_\_. Enter the quantity of the item required. Care shall be observed to avoid requesting excessive quantities of biologicals, X-ray films, and other similar items which deteriorate within comparatively short periods. When practicable, items shall be requested in packages or case multiples to eliminate unnecessary re-packing and handling and to reduce time and cost of issues.

(i) Paging:------. When the listing of items required exceeds one page each page shall be serially numbered near the bottom.

(j) Requisitions shall be signed by the Medical Officer and approved by the Commanding Officer.

(k) Copies designation of:------. The requisitioning activity shall designate the respective copies as follows:

Ribbon copy-----	"Original"
Duplicate-----	"Commandant USCG"
Triplicate-----	"DCGFO"

(l) Prospective movements------. (Ships and mobile organizations only): Enter name of port or place at which ship or organization will be located, so far as is known, as indicated by the Form, except when military considerations prohibit such statements.







177  
If any apparent shortage, over-delivery or other error is found in comparing the medical stores received with the invoice, the medical supply depot issuing the stores shall be informed by letter and requested to ascertain if the discrepancy can be corrected. If the discrepancy cannot be verified as occurring at the issuing depot, and corrected, the stores shall be taken up as invoiced, and adjusted on the books of the receiving activity. A notation indicating the nature of the discrepancy shall be included in the receipt endorsed. The receiving activity shall make no change or alteration in an invoice except when requested to do so by the issuing medical supply depot. Medical stores lost in transit shall be taken up by the activity to which invoiced and a property survey prepared to cover material lost or missing (Art. 1164 N. R.) (Art. 1600 N. T.).

---

By direction



2 June, 1943

120

UNITED STATES COAST GUARD

WASHINGTON

MEMORANDUM FOR ALL PHARMACIST'S MATES

Subj: Treatment of Gonorrhea and Other Conditions with Sulfonamides

Sulfadiazine or Sulfathiazole should be given for the following diseases and injuries:

Gonorrhea: Sulfathiazole works best for gonorrhea; sulfadiazine for the other conditions. One gram (2 tablets) 4 times a day for 5 days, a total of 20 grams (40 tablets). If the infection persists or recurs, give another similar course of the drug after a rest period of 4 days. Watch particularly for toxic reactions during the second course.

Pneumonia, Meningitis, Severe Sore Throat and Ear Infection with tenderness and swelling of the mastoid: First dose, 4 grams (8 tablets); then 1 gram (2 tablets) every 4 hours night and day until the fever, pain and other serious symptoms have subsided, and then for 3 more days.

Bacillary Dysentery: First dose, 3 grams (6 tablets), then 1 gram (2 tablets) every 4 hours night and day for 3 days, or less if dysentery stops, followed by 1 gram (2 tablets) 3 times daily until stools have been normal for 3 days. If no improvement in 3 days, discontinue sulfa drug and give bismuth sub-carbonate, 3 tablets every 4 hours.

Large and Penetrating Wounds and Extensive Burns: To prevent infection give 2 grams (4 tablets) first dose, then 0.5 gram (1 tablet) every 4 hours for 7 days.

Each dose of sulfa drug should be given with 10 grains (2 tablets) of sodium bicarbonate, and patient should take at least 3 quarts of liquids daily. Should severe toxic effects (fever, rash, or vomiting) occur, or the urine become scanty in spite of adequate liquid intake, stop drug immediately. If patient can't swallow tablets, they may be broken up and mixed with a liquid.

*Carl Michel*  
CARL MICHEL  
Medical Director





121 *✓*

WAR SHIPPING ADMINISTRATION

Washington 25, D. C.

March 1, 1944

Instructions for the Use of PENICILLIN

Instructions for Storage, Preparation, and Use aboard Merchant Vessels  
by Medical Officers and Hospital Corpsmen.

Description of Drug

Penicillin is produced by a certain mold, penicillin notatum, and at present is packaged in sterile ampules in powder form varying in color from light yellow to dark brown. Each ampule may contain from 20,000 to 100,000 units (Oxford) of the drug, the amount being indicated by the label on each ampule.

Storage and Exchange of Aging Drug

In order that the drug remain potent for the period of time indicated by the expiration date, it must be stored in refrigerators at a temperature not higher than +4 degrees Centigrade (40 degrees Fahrenheit). At higher temperatures the drug deteriorates rapidly, and in proportion to the temperature.

Since the supply of penicillin is still not nearly adequate to the demand, it is extremely important that the Medical Officer or Hospital Corpsman see that none of the drug is kept beyond the expiration date. Every possible means should be used to trade in the aging drug for a fresh supply - so that it can be used before the period of its potency expires. The following is a list of places where such an exchange may be made:

- (1) In this Country
  - (a) War Shipping Administration Supply Depots.
  - (b) U. S. Marine Hospitals and Relief Stations.
- (2) Abroad
  - (a) Army or Navy Hospitals, or Vessels.
  - (b) Other Merchant Vessels.

Note: When an exchange cannot be made, the drug may be given to one of the above named agencies without any obligation on their part except to furnish a receipt for the drug. This receipt can be presented to the WSA Supply Depot upon returning to this country and a new supply of the drug obtained without additional cost to the operator.



### Use

Penicillin is of proven benefit in the following conditions: Gonorrhea; Pneumonia; Meningitis; Wound infections; Septicemia.

It has not been found to be of benefit in the following conditions: Influenza; Typhoid Fever; Dysentery; Tuberculosis; Malaria,

The drug should not be used for diseases and conditions for which it has not been of proven benefit.

### Preparation and Administration

The drug may be given either intramuscularly or intravenously - but it is simpler to give it intramuscularly (buttocks preferred) and it is just as effective as by the intravenous route. For intramuscular injection dissolve the powder in sterile distilled water or saline solution - one (1) cc of water in normal saline may be used for each 5000 units of the drug. If the entire amount of solution is not to be used at once, the remainder should be placed in the refrigerator at once because, in solution, the drug deteriorates rapidly. Even when kept in a refrigerator the solution cannot be expected to keep its potency for longer than 24 hours. In most cases it should be administered as follows:

20,000 units intramuscularly every three hours day and night until the full dosage is given. It is important that it be given at exactly every three hours in alternating buttocks. It is excreted rather rapidly and the blood level must be maintained for it to be effective.





The following dosages are recommended for the conditions listed below:

Disease	Total No. Units	No. Units per dose	Number of Injections	Interval between Injections	Total time of Treatment
Gonorrhea *	100,000	20,000	5	3 hours	12 hours
Pneumonia **	200,000	10,000	20	3 hours	57 hours (2½ days)
Infected wounds & Osteomyelitis	1,500,000	15,000	100	3 hours	297 hours (12½ days)
Meningitis **	100,000	20,000	5	3 hours	12 hours

\* In the case of gonorrhea, penicillin treatment should not be used until a sulfonamide drug (sulfathiazole or sulfadiazine) has been tried and has failed: One of these drugs should first be given in the standard manner: 15 grains (2 tablets) 4 times a day for five days. If, after that time, there is no improvement, then penicillin treatment may be started.

\*\* Pneumonia and Meningitis also respond favorably to the sulfonamide drugs (sulfathiazole - sulfadiazine) and one of these should be tried first. If there is no improvement with the use of a sulfonamide drug, after 72 hours, then penicillin treatment may be started along with the sulfonamide treatment.

Every Hospital Corpsman, whether he feels himself thoroughly familiar with the use of penicillin or not, should make use of every opportunity to visit hospitals, clinics, and vessels which carry a Medical Officer in order to constantly refresh his knowledge on the use of this drug. Many new facts about its use are being discovered daily. In this country Marine Hospitals will be especially well equipped to keep Hospital Corpsmen informed on this subject.

### Reports

In order for the War Shipping Administration to be able to obtain supplies of this drug it is necessary that the disposition of each lot of it be accounted for. The Medical Officer or Hospital Corpsman should therefore report the disposition of each batch of the drug, whether it was (a) used (b) exchanged for a fresh batch (c) given to another ship or agency (d) deteriorated before it



could be disposed of. If the drug was administered to a patient, the report should give the name of the patient, the disease for which the drug was given, the date given, the amount given, and whether it was effective or ineffective. This report should be sent to: Doctor W. G. Terwilliger, Deputy Medical Director, War Shipping Administration, Room 6879 Commerce Building, Washington 25, D. C.

(Sgd.) WILSON T. SOWDER  
Wilson T. Sowder  
Surgeon, USPHS  
Communicable Disease Activities

Approved:

(Sgd.) WILLIAM G. TERWILLIGER  
William G. Terwilliger, Commander (MC) USNR  
Deputy Medical Director  
Division of Operations





125

WAR SHIPPING ADMINISTRATION  
Washington

Method for Allocating Quinine for each Vessel per Voyage

Due to the extreme scarcity of supplies of Quinine, it is definitely necessary to confine its use to the treatment of Malaria and only in those cases resistant to other Anti-Malaria therapy. A simple rule for calculating total amounts of Quinine, to be carried on each ship in relation to the number of crew members and the length of the voyage is as follows:

Rule: 1 bottle 5 gr. tablets 500/bottle for 75 men for a voyage of 3 months (90 days)

1. 500 tablets, 5 gr. each = 2,500 gr. Quinine
2. 75 men for 90 days = 6,750 man days
3. Therefore, it is equivalent to 0.37 gr. Quinine per man per day voyage.

EXAMPLE:

60 crew members

80 day voyage

60 men X 80 days = 4,800 man days - total

4,800 man days X 0.37 gr. Quinine per man per day =  
1,700 gr. Quinine to be allocated to vessel.

(Sgd.) PAUL L. GRIFFITH  
Paul L. Griffith  
Division of Operations

Approved:

(Sgd.) W. G. TERWILLIGER  
W. G. Terwilliger  
Deputy Medical Director  
Division of Operations



## COAST GUARD VESSELS

REQUISITION FOR MEDICAL SUPPLIES, Preparation of





127

UNITED STATES COAST GUARD

Boston, Massachusetts

Address Reply to  
DISTRICT COAST GUARD OFFICER  
CUSTOM HOUSE  
BOSTON, MASS.

And Refer To File No. m-423

To:

Subj: Medical supplies not furnished by the Navy; procurement  
of.

1. Consideration will be given to the procurement of Medical and Dental supplies and equipment not listed in the Navy Medical Supply Catalog provided full justification therefor is furnished. It must be shown that no reasonable substitutes are available from the Navy, that the need has been definitely established, and that the articles desired are proper and suitable for the purposes of the requisitioning unit.

2. Resubmit your request with full justification as outlined in paragraph 1.

L. C. WALKINS,  
By direction.



128 A

# EMERGENCY DENTAL TREATMENT

(Compiled by G.M. Noss., A.D.S.(R) USPHS)

## TABLE OF CONTENTS

Page No.

Painful Cavities and Lost Fillings-----	1
Inflamed Pulp (Toothache)-----	1
Alveolar Abscess-----	2
Third Molar (Wisdom tooth) Flap Infections-----	3
Vincent's Infection (Trench Mouth; Sore Gums)-----	3
Canker Sores-----	4
Dislocation of Lower Jaw-----	5
Fracture of Lower Jaw-----	5
Tooth Brushing-----	5





28B

Painful cavities and lost fillings: Cavities if sufficiently large are painful where subjected to thermal changes (generally cold), sweets, or pressure from some foreign material such as food. Food may become impacted in cavities causing pressure, pain and irritation to the gum tissues; and if allowed to remain in the cavities, a foul odor and taste will result.

Treatment: Remove food debris and soft decay with a spoon excavator. Isolate the tooth with cotton rolls or absorbent cotton. Wipe out cavity with a cotton pellet moistened slightly in eugenol or dentalone and insert a medicated filling made by mixing zinc oxide and eugenol (active ingredient of oil of cloves) to a putty consistency. Use the same material in cavities from which the fillings have been lost, sterilizing the cavity first with phenol followed by alcohol.

Inflamed pulp or pulpitis (toothache); An inflamed pulp (pulpitis) will in the acute form produce a sharp, excruciating, lancinating pain -- the real old-fashioned toothache. It must be differentiated from a tooth abscess which will be described later. Look for a large cavity (or a large filling under which there may be decay) in which the decay process extends very deeply. The decay has penetrated to the pulp (nerve) tissue or even into it. Infection of the pulp follows; Temperature changes generally aggravate the pain. Tooth abscess results when the infection and the inflammatory processes accompanying it pass beyond the tooth apex and invade the peridental membrane and bone surrounding the tooth in the jaw. The symptoms are soreness to touch and an elongation of the tooth making it seem high or long to bite on.

Treatment: Insert a pellet of cotton soaked in 5% cocaine into the cavity for a few minutes to get some anesthetic effect. Then scoop out the soft matter gently with a spoon excavator. Then introduce a small pellet of cotton moistened with dentalone or eugenol into the cavity and fill the remain-



der of the cavity with another piece of cotton soaked in compound tincture of benzoin. This will prevent food from packing in and pressing on the pulp (nerve tissue). Extract the tooth only if pain cannot be controlled in this way and with sedation.

Alveolar abscess: If the toothache is not relieved by eugenol dressings, and the tooth becomes sore to touch, the infection has passed beyond the root apex. It causes inflammation of the membrane surrounding the tooth. Tapping the tooth makes it press against this inflamed membrane and results in the tenderness. The pus and gasses produced by the infectious breakdown of the soft tissues (pulp tissue) inside the tooth and in the bone surrounding the root end of the tooth (the periodontal membrane) add to the pressure and increase the pain. This abscess formation will either resorb resulting in a chronic alveolar abscess with diminution of painful symptoms. This happens in a great majority of the cases. Otherwise the abscess will become acute so that the pus formed burrows through the bone into the soft tissues (periosteum and mucous membranes) forming a painful swelling over the root of the tooth involved at the fold of the gum and cheek. Toxic symptoms such as elevated temperature, malaise, etc. may accompany the acute stage of the abscess.

Treatment: Use hot saline irrigations keeping the hot liquid over the affected area. If resorption occurs, the pain will subside and the tooth can be extracted where a dental officer is available. If the abscess fulminates and a swelling of the soft tissues develops involving the side of the jaw, use small poultices made of hot prunes or raisins wrapped in gauze and applied at the buccal or labial fold over the tooth affected. Keep the poultices constantly hot by re-heating at frequent intervals. Keep applying until the abscess points or becomes fluctuant. Digital examination will determine when fluctuation has developed and where this point of fluctuation is. It may take one to three days from the time of onset of symptoms. This is the time for in-







... is available, spray locally and incise this area to the bone in the direction of the apex of the tooth for the <sup>120</sup>evacuation of pus. Insert a small iodoform drain and allow to remain for twenty-four hours. Symptoms will generally subside and the tooth may be extracted at a later date. A pyorrhea abscess which may form along the side of the tooth root may be similarly treated except that drainage may be obtained by inserting a fine pointed instrument carefully between the tooth and gum.

Third molar (wisdom tooth) flap infections: The flap or pocket of tissue overlying an erupting third molar (usually lower) provides an ideal environment for the growth and multiplication of germs. Food debris and other irritants packing into or under this flap lower its resistance to infection. Infections here produce an inflammation of the soft tissues which may develop into abscess formation (pericoronal abscess) so severe and acute as to cause trismus (inability to open mouth), swelling, and general toxic symptoms.

Treatment: Gently wash out area around the erupting tooth with hot saline using an ear syringe or any other type available. Tease a drop or two of 2% gentian violet held by the beaks of the cotton pliers under the flap allowing the dye to run into the depths of the flap. Repeat daily and have patient use hot saline irrigations often during the day. Supplement with medication (PAC with codeine) if necessary, NEVER lance an inflamed flap. Reduce the severity of the symptoms until a dental officer is available.

Vincent's Infection, trench mouth, sore gums: Any factor causing spongy, inflamed gums such as tart or deposits, subclinical vitamin deficiencies, erupting third molars, etc produces an environment in the mouth suitable for the growth and multiplication of Vincent's organisms (fusiform bacillus and Vincent's spirochete). When this occurs, the gums become sore and bleed easily when eating or brushing the teeth. A grayish-white film forms over the gums, especially between the teeth, usually this is present on the labial or buccal (outside aspect of the gums. The destruction of the gum papillae between the teeth (interdental papillae) is an important diagnostic sign in the more acute conditions.



138  
/31

as is the very foul fetid odor to the breath. The less acute condition manifests itself as a thin line of red, unflamed tissue about the teeth. A culture of Vincent's organisms on a slide is not significant. In the acute Vincents, the patient may have fever and malaise.

Treatment: Wash the mouth with hot sodium perborate (One teaspoon to half a glass of water). Isolate sections of the mouth with cotton rolls or absorbent cotton, dry the gums and apply a small pellet of cotton dipped in 10% chromic acid to the space between the teeth. Allow to remain a minute, then rinse with hydrogen peroxide keeping in mouth for two minutes. Use 50% hydrogen peroxide (Hot) mouth washes four to six times a day. Repeat chromic acid treatments for about 3 - 4 days and continue with the peroxide or perborate washes. From the start supplement the diet with a high intake of vitamin C and B complex. Avoid all use of tobacco and spicy foods. Sterilize mess gear of patient thoroughly and avoid contamination.

Canker Sores: These are small rounded ulcerations about 2 to 3 mm. in diameter, covered by a grayish - white exudate and surrounded by a very narrow slightly raised deep red zone. They occur on the inner surface of mucous membranes, lips, and tongue. They appear most often at the buccal or labial fold where the cheek or lip meets the gum. They may be caused by an allergic response to some food, although there is some belief that it may be the result of a virus infection.

Treatment: Isolate area with cotton rolls and apply on a small cotton pellet 25% chromic acid followed by peroxide. If this is not available, carefully touch the ulcer with a small pellet of cotton dipped in phenol solution. Hold on the canker sore for a few moments to cauterize. Avoid touching the surrounding healthy tissue. A lunar caustic (silver nitrate) pencil may be used in a similar manner touching only the ulcerated area. Repeat in a day if necessary.







15  
Dislocations: In jaw dislocations, the patient is unable to close his jaw or bring his teeth together. It is generally caused by an extensive jaw movement or a very wide yawn.

Treatment: Place the thumbs of both hands on the lower molar (right and left) teeth. The fingers are under the chin. Press steadily down and back with the thumbs on the back teeth and pull upward with the fingers under the chin. Protect the thumbs when the jaws click together.

Fracture of the Lower Jaw: The symptoms of jaw fracture are i) pain on movement of jaw; ii) irregularity of teeth, possibly with some loose teeth and bleeding from gums; iii) difficulty in eating, drinking, swallowing and talking. The causes are many, but those seen most often will be due to traumatic injuries to the face and jaws.

Treatment: Place the palm of the hand below the jaw and gently raise it to bring the lower teeth against the upper teeth. Support the jaw in this position with a bandage under the chin and over the top of the head. If the patient starts to vomit, remove the bandage immediately and turn the head to one side supporting the jaw with the palm of the hand. Re-apply the bandage when vomiting ceases. Secure services of dental officer as promptly as possible.

Tooth brushing: Too much emphasis cannot be placed on keeping the mouth clean. An old axiom states that "a clean tooth never decays." Strict oral hygiene not only prevents or retards decay, but helps maintain the health and tone of the soft tissues enabling them to resist infection better. Use two tooth brushes, one in the morning and the other at night. Brush the teeth from the gum tissue towards the biting or chewing surface of the tooth. Use a powder preferably, Salt or baking soda are both very effective and satisfactory dentifrices.



Finally, whenever possible, have the teeth checked twice a year by a dental officer.

\*\*\*\*\*





CHEMICAL WARFARE

1. Since this has been treated as an entirely separate subject it will be but briefly reviewed.
2. Remember that your gas mask is your protection. Take proper care of it and know how to apply it quickly, surely and correctly.
3. MUSTARD:
  - (a) Is a liquid which turns to a gas and persists in area from days to weeks.
  - (b) Smells like garlic or horseradish.
  - (c) Has no immediate effects.
  - (d) Produces burns on exposed parts in 1 to 24 hours.
  - (e) When exposed:
    - 1 Remove from area to decontamination center and never to a First Aid or dressing station.
    - 2 Strip off clothes.
    - 3 Wash thoroughly with running water and strong soap.
    - 4 Apply carbon tetrachloride saturated with chlorine or bleach solution.
    - 5 Wash eyes with boric acid or salt solution, or 2% soda bicarbonate solution.
  - (f) Treatment must be given within a very few minutes.
  - (g) Be careful in handling anyone who has been exposed to mustard for you may get burned by becoming contaminated.
  - (h) Bury any contaminated clothing or equipment.
4. LEWISITE:
  - (a) Is a liquid which turns to a gas and persists in area for days.
  - (b) Smells like geraniums.
  - (c) Immediately, produces nasal irritation. Liquid on the skin produces a sharp tingling sensation progressing to painful irritation. The liquid produces deep burns. Irritation to the eyes apt to be more severe than mustard.
  - (d) Produces burns (deep) on exposed parts in 1 to 24 hours.
  - (e) When exposed:
    - 1 See under Mustard Gas.
    - 2 Same as Mustard.
    - 3 Same as Mustard.
    - 4 Wash with 5% water solution of caustic soda (sodium hydroxide).
    - 5 Follow caustic soda wash with washing with alcohol.
    - 6 Wash eyes with 1/2% hydrogen peroxide solution, or if not available, do as under mustard.
  - (f) Treatment must be given immediately. After treatment, when evacuating, see that the patient is kept warm and quiet.
  - (g) Same as mustard.
  - (h) Same as mustard.



## 5. PHOSGENE:

- (a) Is a gas, persisting for only a few minutes.
- (b) Smells like ensilage or new cut hay.
- (c) Immediately causes coughing and tightness in the chest and irritation of the eyes.
- (d) Produces an effect similar to pneumonia.
- (e) When exposed:
  - 1 Same as under mustard.
  - 2 Keep quiet and warm.
  - 3 Give non-alcoholic stimulants such as tea or coffee.
  - 4 Administer oxygen if breathing is too labored.

## 6. TEAR GAS:

- (a) Is a solid substance which when burned produces gas. As a solid it will remain for days, but as a gas it persists for only about 10 minutes.
- (b) Smells like locust or apple blossoms or ripe fruit.
- (c) Immediately, produces profuse discharge of tears from the eyes. In warm weather it produces a slight irritation of the skin.
- (d) No prolonged effects.
- (e) When exposed:
  - 1 Remove to pure air and face the wind.
  - 2 Do not rub the eyes.
  - 3 Wash eyes with boric acid solution.
  - 4 If skin is irritated wash with a 10% soda bicarbonate in 50% alcohol solution.

## 7. ADAMSITE:

- (a) Is an irritant smoke.
- (b) Has no pronounced odor. Possibly, smells like burning smokeless powder.
- (c) Immediately can be seen as a canary yellow smoke haze.
- (d) No prolonged or persistent effects.
- (e) When exposed:
  - 1 Remove to pure air.
  - 2 Breathe low concentration chlorine from bleaching powder bottle.
  - 3 Watch closely, for victim is apt to be very depressed and try to commit suicide.

8. WHITE PHOSPHOROUS:

- (a) Is a solid which burns and vaporizes on exposure to air.
- (b) Has odor of wet matches.
- (c) Burning particles produce immediately a glow and incendiary effect, plus a dense smoke. Can produce very bad burns if solid phosphorous gets on the skin and the vapors can set up lung irritation.
- (d) Persistent effects are from burns from solid phosphorous.
- (e) When exposed:
  - 1 Remove from scene.
  - 2 If any particles are embedded in skin, keep them wet (for phosphorous can burn only in the presence of air) until they are removed.
  - 3 After removing particles treat as any other burn.





136 ~~136~~  
136  
REQUIREMENTS FOR PHARMACIST'S MATE

1. A man must have shown some aptitude for assignment to the medical department and must be found qualified by examination in the following before he may be rated pharmacist's mate, third-class:

(A) Possess a satisfactory knowledge of the following subjects: Materia medica-therapeutic classification of drugs of the United States Pharmacopoeia, their common, botanical, and official names, parts used, doses and active principles, toxic doses, poisonous symptoms, and antidotes; nursing-practical and theoretical, beds and bed making, baths treatment other than by mouth, external applications, temperature, pulse, respiration, symptoms, names and uses of surgical instruments and appliances, medical and surgical nursing, including preparation of patient for operation.

(B) Possess a satisfactory knowledge of the following subjects; elementary hygiene and sanitation (general and field) water, air, ventilation, heating and lighting of quarters, disposal of wastes, disinfection and disinfectants, sterilization, handling of infectious disease and prevention of disease.

2. In addition to the qualifications for pharmacist's mate, third class, a man must be found qualified by examination in the following before he may be rated PHARMACIST'S MATE, SECOND CLASS.

(A) Possess a satisfactory knowledge of the following subjects: Diets and messing for the sick, classes of food, various classes of diet, diet for special diseases, obtaining and preparation of food, proper service of diets and patients.

(B) Posses a satisfactory knowledge of the following subjects; clerical procedure and forms, knowledge and preparation of forms, typewriting, and ability to formulate tables and charts.

(C) Possess a satisfactory knowledge of the following subjects; pharmacy and chemistry, various pharmaceutical processes employed in the manufacture of official preparations, relative proportions of the more important drugs entering into their composition, weights and measures, specific gravity, compatibilities, chemical symbols, the formulae of the more important chemicals with tests for identity and the reactions produced by their combination.



3. In addition to the qualifications for pharmacist's mate, second class, a man must be found qualified by examination in the following before he may be rated PHARMACIST'S MATE, FIRST CLASS:

(A) Possess a satisfactory knowledge of the following subjects: Deckbay duties and management, care of property and records, systematic duties in the care of the patient, systematic detail of hospital corpsman and assistants to their duties, care of the storerooms and dispensary, proper stowage and safeguarding of property and records.

(B) Possess a satisfactory knowledge of the following subjects: Objects and methods of producing anesthesia, forms of anesthesia, anesthesia-producing drugs, safeguarding of anesthetics, administration of anesthetics, restorative methods in anesthesia, instruments used and general anesthesia in special operative procedures.

4. In addition to the qualifications for pharmacist mate, first class, a man must complete the prescribed course from the Coast Guard Institute and must be found qualified by examination in the following before he may be rated PHARMACIST MATE:

(A) Be a good copyist. A satisfactory mark will be given for copying without error a printed page of the regulations at the rate of twenty words per minute.

(B) Possess a satisfactory knowledge of the following subjects: Supplies and property accountability, preparation of requisitions, vouchers, invoices, etc., commissary supervision, preparation of bills of fare, foods, special diets, preparation of official letters, care of records and use of the blank forms.







138  
8 December, 1943

UNITED STATES COAST GUARD

WASHINGTON

MEMORANDUM FOR ALL PHARMACIST'S MATES

Subj: Treatment of Gonorrhea and Other Conditions with Sulfonamides

Sulfadiazine or Sulfathiazole should be given for the following diseases and injuries:

Gonorrhea: Sulfathiazole works best for gonorrhea; sulfadiazine for the other conditions. One gram (2 tablets) 4 times a day for 5 days, a total of 20 grams (40 tablets). If the infection persists or recurs, give another similar course of the drug after a rest period of 4 days. Watch particularly for toxic reactions during the second course.

Pneumonia, Meningitis, Severe Sore Throat and Ear Infection with tenderness and swelling of the mastoid: First dose, 4 grams (8 tablets); then 1 gram (2 tablets) every 4 hours night and day until the fever, pain and other serious symptoms have subsided, and then for 3 more days.

Bacillary Dysentery: First dose, 3 grams (6 tablets), then 1 gram (2 tablets) every 4 hours night and day for 3 days, or less if dysentery stops, followed by 1 gram (2 tablets) 3 times daily until stools have been normal for 3 days. If no improvement in 3 days, discontinue sulfa drug and give bismuth subcarbonate, 3 tablets every 4 hours.

Large and Penetrating Wounds and Extensive Burns: To prevent infection give 2 grams (4 tablets) first dose, then 0.5 gram (1 tablet) every 4 hours for 7 days.

Each dose of sulfa drug should be given with 10 grains (2 tablets) of sodium bicarbonate, and patient should take at least 3 quarts of liquids daily. Should severe toxic effects (fever, rash, or vomiting) occur, or the urine become scanty in spite of adequate liquid intake, stop drug immediately. If patient can't swallow tablets, they may be broken up and mixed with a liquid.

CARL MITCHELL  
Medical Director



OP-601-703

## UNITED STATES COAST GUARD

Boston, Massachusetts

OF ICE OF  
DISTRICT COAST GUARD OFFICER  
FIRST NAVAL DISTRICT

29 October, 1943

From: District Coast Guard Officer, First Naval  
District, All Coast Guard Units, First Naval  
District.

Subject: Inoculations necessary for personnel in  
tropical regions.

1. Personnel stationed in tropical regions must be inoculated against yellow fever, typhus, and cholera.
2. "Tropical regions" includes that section of Africa lying between 12 degrees South latitude and 13 degrees North latitude and that section of the South American mainland and the islands immediately adjacent thereto lying between 30 degrees South latitude and 13 degrees North latitude.
3. All Coast Guard personnel on active duty in areas where SERIOUS danger from plague exists shall be immunized against that disease. The consensus at this time is that there is no indication for its administration prior to departure from the United States.
4. When possible, personnel who are to be transferred to this area should contact the District Medical Officer for arrangements for receiving the necessary inoculations before departure.

*W. M. Derby*  
W. M. DERBY.





OFFICE OF THE CHIEF MEDICAL OFFICER  
COAST GUARD HEADQUARTERS  
CIRCULAR NO. 4

140

DATE 30 Decombor, 1943

MEMORANDUM FOR - DISTRICT MEDICAL OFFICERS.

1. Insect repellents, which experimentally have proved to be quite satisfactory and far superior to oil of citronella and other substances used in the past, are now available. They should be obtained from the U. S. Naval Medical Supply Depots and employed in all areas where personnel are exposed to the bites of mosquitoes, flies, gnats, fleas, and chiggers (red bugs). The repellent for these insects is a liquid contained in a bottle of convenient size for a pocket or kit.

For mosquitoes, biting flies, gnats, and fleas, this repellent should be used in the following manner:

Shake about 12 drops into one hand. Rub hands together, then apply in a thin layer by rubbing all exposed areas, until they are covered. Apply in a similar manner on clothing where insects are biting frequently. Apply with caution around eyes and mouth.

The repellent effect lasts from 2 to 4 hours, after which the application should be repeated.

For chigger protection, the repellent should be used as follows:

Apply  $\frac{1}{2}$  inch barrier to all openings of the uniform by drawing mouth of bottle along cloth. Apply to inside neck, fly and cuffs of shirt; inside waist, fly and cuffs of trousers, and on socks above shoes. Loggings should be treated along all edges.

Clothing may be treated several days before it is worn and one application is effective until the uniform is normally changed for laundering.

The liquid repellents now available are solvents of paints and some plastics. Repellents without this disadvantage may possibly be found in the near future.

The insecticide for the destruction of body lice, head lice, or crab lice is a powder contained in a can with a sifter top.

To use, dust lightly the seams of clothing of infested parts of the body at weekly intervals.

This powder is also of value for the prevention of tick bites. For this purpose, dust the belt line and inner side of the clothing of the lower extremities, including socks and shoes. When personnel are sleeping on the ground, their bedding may be protected from infestation with crawling insects by lightly dusting it with powder at weekly intervals.





The insect repellents and insecticide may be obtained from the U. S. Naval Medical Supply Depots under the following designations: 141

<u>Stock No:</u>	<u>Symbol:</u>	<u>Status:</u>	<u>ITEM:</u>	<u>Unit:</u>	<u>Approx. Price:</u>
S13-450	g	T	INSECT, REPELLENT, liquid, for mosquitoes, biting flies, gnats, fleas and chiggers....(1) 2 ox. bot.		\$ 0.17
S13-451	g	T	INSECTICIDE, Powder, for body lice and ticks.....(1) 2 oz. pkg.		\$ -.17

Headquarters desires that this data relative to insect repellents and insecticide for lice be given wide distribution throughout Medical Department activities of the Coast Guard.

2. The following is quoted from a letter from the Chief of the Bureau of Medicine and Surgery, Navy Department, to a number of navy addresses relative to emergency procurement of medical supplies for seagoing units of the Coast Guard dated 13 April, 1943, which is self-explanatory.

"Effective immediately, Commanding Officers of seagoing units of the Coast Guard may request emergency issue of medical supplies (as distinguished from equipment) from the currently nearest naval vessel or shore establishment of the Navy. Any Medical Department activity having available medical supplies is authorized to issue such supplies to vessels of the Coast Guard, upon prescribed letter request. Such issues are subject to the approval of the requisitioned activity. Items issued shall be invoiced on S&A Form 71 which shall be receipted by the receiving activity. A signed copy of such voucher shall be submitted to this Bureau by the issuing activity."

3. Each month there is mailed from Headquarters' Medical Office to each Medical Officer serving with the Coast Guard, a copy of the BUMED NEWS LETTER which is a restricted publication from the Bureau of Medicine and Surgery. This publication contains valuable data of interest to Medical Department activities and should be thoroughly read by all Medical Officers serving with the Coast Guard. There is no objection to this publication being read by pharmacist's mates where indicated.

4. Reference is made to Circular 3 from this office relative to reports of medical surveys. In a few instances reports of medical surveys are being made to Headquarters on other than the prescribed Navy - Coast Guard form. In order to secure uniformity of practice, this office desires that the established Navy - Coast Guard form be used exclusively. In many instances survey forms are not being completely executed and this partial execution of the form destroys its value to Headquarters. Care should be taken by all medical officers serving on Medical Survey Boards that this form be properly executed in all details.

Attention is called to "Facts as Follows". Under this section give facts not opinions. Do not duplicate recommendations but give supporting evidence.





In connection with the authority contained in Personnel Bulletin 122-42 a copy of the medical survey upon which discharge is predicated is to be forwarded to Headquarters with the enlistment contracts and other supporting papers. Notation should be made on the survey reports in these cases, indicating the date of discharge and citing Personnel Bulletin 122-42 as authority for discharge.

5. Many health records are being received at Headquarters with form 2525-E, termination of health records, incompletely executed. Care should be taken that all forms 2525-E be properly terminated upon all instances of discharge, retirement, death or desertion. It is desired that the execution of form 2525-E be brought to the attention of Medical Officers serving in the field.

6. The following data relative to tetanus inoculations is taken in part from letter Bureau of Medicine and Surgery of 4 March, 1943 and is furnished for the information of all Medical Officers and Hospital Corpsmen. It is to be followed in the case of all Coast Guard personnel.

"All personnel of the U. S. Navy and U. S. Marine Corps on active duty (regular, reserve, and retired), regardless of age, shall be immunized against tetanus, using alum precipitated (insoluble) tetanus toxoid.

The INITIAL IMMUNIZATION shall consist of two injections, 0.5 ( $\frac{1}{2}$ ) cc. of alum precipitated tetanus toxoid, given intramuscularly with an interval of not less than 4 or not more than 8 weeks.

ROUTINE "BOOSTER" (OR STIMULATING) IMMUNIZATION. One year after the completion of initial immunization, each individual shall be given a single "booster" (or stimulating) injection of 0.5 ( $\frac{1}{2}$ ) cc. of alum precipitated tetanus toxoid intramuscularly and thereafter every four (4) years in the absence of recorded emergency booster injections. When possible, in addition to the provisions of pars. 2 and 3 above, all personnel shall receive a "booster" injection of 0.5 ( $\frac{1}{2}$ ) cc. of alum precipitated tetanus toxoid before going into a combat zone, irrespective of time interval since previous injection. When practicable, this should be given approximately one month before entering the combat zone.

EMERGENCY "BOOSTER" INJECTIONS. In addition to the initial and routine "booster" injections, emergency "booster" immunization, consisting of 0.5 ( $\frac{1}{2}$ ) cc. of alum precipitated tetanus toxoid given intramuscularly, shall be administered immediately to the following:

- a. Each individual who incurs a wound or severe burn in battle.
- b. Patients undergoing secondary operations or open manipulations, when, in the opinion of the responsible medical officer, there exists the possibility of contamination with tetanus spores or organisms.





b. ROUTINE "BOOSTER" IMMUNIZATION.

(1) All personnel shall receive 0.5 ( $\frac{1}{2}$ ) cc. intramuscularly, 1 year after completing the initial immunization and every four (4) years thereafter.

(2) When practicable, 1 month before entering a combat zone, all personnel will receive 0.5 ( $\frac{1}{2}$ ) cc. intramuscularly, irrespective of time interval since previous injection with alum precipitated tetanus toxoid.

c. EMERGENCY "BOOSTER" IMMUNIZATION. All personnel sustaining burns or wounds in battle, or who incur non-battle puncture wounds or burns in which there is danger of contamination with tetanus spores or bacilli, shall be given an emergency injection of 0.5 ( $\frac{1}{2}$ ) cc. of tetanus toxoid injected intramuscularly, providing that they have received initial immunization.

It is obvious that in combat areas where health records and even identification tags are often not available, absolute reliance must be placed upon the basic tetanus immunization of all personnel. Booster injections as outlined are without value for immunization protection unless basic immunization has been previously given."

7. There seems to have been recently an unusual number of suicides. Medical Officers should be on the alert to discover men with suicidal tendencies and take proper steps to prevent suicide.

8. Virus pneumonia and kerato-conjunctivitis are now reportable communicable diseases and should be reported.

9. With the idea of insuring proper preservation of food in warm weather, facilities for refrigeration should be inspected and proper recommendations made if necessary.

10. At certain stations the dentists are making oral inspection of men at the same time that routine short-arm inspections are done. This might well reduce the incidence of Vincent's infection.

11. At various units standard Red Cross first aid courses are given to personnel other than pharmacist's mates by medical officers. When time permits this appears to be an excellent practice. By contacting the local Red Cross representative physicians may be authorized to issue certificates to successful graduates. Likewise textbooks and outlines can be obtained through local Red Cross representatives.

12. Certain Districts report considerable reduction in incidence of venereal disease apparently due to more thorough instruction in its prevention.





13. In order to insure better administration and medical care at least two districts have divided their districts into sections. Each section has a medical officer in charge of medical activities. The place of duty of the medical officer is in his respective section.

14. At certain stations where there are insufficient dental chairs to handle all the necessary work there are two dentists for each chair and they work in shifts keeping the chairs in use 12 to 14 hours a day.

15. In one instance 16 blood typings done in the field were checked by a reliable laboratory and three of these were found to be incorrect. Where pharmacist's mates are entrusted to do blood typing their work should be carefully supervised. It has been noted that when using rabbit anti-human serum that agitation is necessary to bring about agglutination. It seems advisable therefor to agitate all preparations slightly just before making a final reading.

/s/ CARL MICHEL  
Medical Director



145

Address reply to  
DISTRICT COAST GUARD OFFICER  
CUSTOM HOUSE  
BOSTON, MASS  
And refer to file No. m-423

17 December, 1943

MEMORANDUM FOR MEDICAL OFFICERS AND PHARMACIST'S MATES, 1ND

Subj: Requisition for Medical Supplies from Navy Medical Supply Depot on form NMS-4; preparation of.

1. Original and two (2) copies are sent to DCGNO who will send original to NMSD, one (1) copy to Headquarters, and retain one copy for file.
2. Each unit is limited to two (2) requisitions annually. Special requisition may be submitted in an emergency for items of truly emergent character whose need could not have reasonably been foreseen.
3. Units having both medical and dental facilities shall submit consolidated requisition to cover the requirements of both.
4. Items of Class 7 and Class 8 are not to be requisitioned on form NMS-4. They will be obtained from Coast Guard as heretofore.
5. Whenever it becomes necessary for any unit to replenish its stock of routinely used items to last out a six months period, the material if available, will be furnished by District Coast Guard Medical Supply Unit upon receipt of properly prepared form NCG-2556, original and three (3) copies. The foregoing is not to be interpreted as relaxing the necessity of making a reasonably accurate estimate of anticipated requirements for a six (6) months period.
6. All classes of items as listed in the Naval Medical Supply Catalog may be included in a single requisition. Separate requisitions are no longer required for Supplementary Items, Biologicals etc. No item will be requisitioned that is not listed in NMSD Catalog.
7. Items listed in catalog changes as being temporarily discontinued are not to be requisitioned. These items should be so marked in catalog as to avoid including them on requisition. Also, supplementary class items preceded by letter "X" in status column are not to be requisitioned.
8. The following instructions are to be observed:
  - (a) Enter official name of the requisitioning unit, date, mail address, etc.
  - (b) Spaces for information which does not apply to Coast Guard, such as allotment number, total allotment, etc., should be left blank.





numbered consecutively, beginning with 1.

146

(d) Stock No. \_\_\_\_\_. The stock number of each item, as indicated by the Supply Catalog shall be entered in this column on the same line on which the name of the item begins. Items and stock numbers shall be arranged in the exact order in which they appear in the Supply Catalog. The stock class number and name shall be typed at the head of each class of items requested. Two blank spaces shall be left between each class of items.

(e) Item: \_\_\_\_\_. List each item requested, beginning on the same line with the stock number, exactly as listed in the Supply Catalog, except that information contained in parenthesis may be omitted. Indicate the electric current on which electrical apparatus will be required to operate, stating the voltage and type of current (A.C. or D.C.). If alternating current, state also cycles and phase. (Example) (110-v., D.C.; 220-v., D.C.; 110-v., 60 cy., 1-ph). When replacement parts, or accessories, for X-ray, electrically operated, or other equipment is required, and adequate description of the part, and of the equipment item for which the part is required, or with which the accessories are to be used, shall be stated, including the make, model, serial number, part number, or such description as may be available, including electric current date, when indicated, in order to enable the procuring medical supply depot to accurately identify the material required.

(f) Unit: \_\_\_\_\_. Enter on the same line with the stock number and the first line of the item description, the "Unit of quantity" as stated in the Supply Catalog. "One," "Pair," "Dozen," "Pkg.," "100-gm. bot.," etc.

(g) In the column headed "Minimum Stock" on MFS-Form 4, this should be lined out and the heading "on order not received" substituted therefor, accordingly, should additional stock of any item be requested over and above that which was previously requisitioned and back ordered by the Navy, it is necessary that the quantities so back ordered be reported in this particular column.

(h) Required: \_\_\_\_\_. Enter the quantity of the item required. Care shall be observed to avoid requesting excessive quantities of biologicals, X-ray films, and other similar items which deteriorate within comparatively short periods. When practicable, items shall be requested in packages or case multiples to eliminate unnecessary repacking and handling and to reduce time and cost of issues.

(i) Paging:-----. When the listing of items required exceeds one page each page shall be serially numbered near the bottom.

(j) Requisitions shall be signed by the Medical Officer and approved by the Commanding Officer.

(k) Copies designation of:-----. The requisitioning activity shall designate the respective copies as follows:

Ribbon copy-----"Original"  
Duplicate-----"Commandant USCG"  
Triplicate-----"DCGNO"

(l) Prospective movements----- (Ships and mobile organizations only): Enter name of port or place at which ship or organization will be located, so far as is known, as indicated by the Form, except when military considerations prohibit such statements.



(m) CORRECTION OF APPARENT ERRORS.---

147

If any apparent shortage, over-delivery or other error is found in comparing the medical stores received with the invoice, the medical supply depot issuing the stores shall be informed by letter and requested to ascertain if the discrepancy can be corrected. If the discrepancy cannot be verified as occurring at the issuing depot, and corrected, the stores shall be taken up as invoiced, and adjusted on the books of the receiving activity. A notation indicating the nature of the discrepancy shall be included in the receipt endorsed. The receiving activity shall make no change or alteration in an invoice except when requested to do so by the issuing medical supply depot. Medical stores lost in transit shall be taken up by the activity to which invoiced and a property survey prepared to cover material lost or missing (Art. 1164 N. R.) (Art. 1600 N. T.).

---

By direction





148

UNITED STATES COAST GUARD  
Boston, Mass

DISTRICT COAST GUARD OFFICER  
CUSTOMHOUSE  
Boston, Mass.  
And refer to file No. m-423

13 June, 1944

MEMORANDUM FOR MEDICAL OFFICERS AND PHARMACIST'S MATES, 1ND

Subj: Requisition for Medical Supplies from Navy Medical Supply  
Depot on form MMS-4; preparation of.

1. Original and five (5) copies are sent to DCGMO who will send original and three (3) copies to MMSD, one (1) copy to Headquarters, and retain one copy for file.
2. Each unit is limited to two (2) requisitions annually. Special requisition may be submitted in an emergency for items of truly emergent character whose need could not have reasonably been foreseen.
3. Units having both medical and dental facilities shall submit consolidated requisition to cover the requirements of both.
4. Items of Class 7 and Class 8 are not to be requisitioned on form MMS-4. They will be obtained from Coast Guard as heretofore.
5. Whenever it becomes necessary for any unit to replenish its stock of routinely used items to last out a six months period, the material if available, will be furnished by District Coast Guard, Medical Supply Unit upon receipt of properly prepared form MCG-2556, original and three (3) copies. The foregoing is not to be interpreted as relaxing the necessity of making a reasonably accurate estimate of anticipated requirements for a six (6) months period.
6. All classes of items as listed in the Naval Medical Supply Catalog may be included in a single requisition. Separate requisitions are no longer required for Supplementary Items, Biologicals etc. No item will be requisitioned that is not listed in MMSD Catalog.
7. The following instructions are to be observed:
  - (a) Enter official name of the requisitioning unit, date, mail address, etc.
  - (b) Spaces for information which does not apply to Coast Guard, such as allotment number, total allotment, etc., should be left blank.
  - (c) Item No. \_\_\_\_\_. Each item of the entire requisition shall be numbered consecutively, beginning with 1.





(d) Stock No. \_\_\_\_\_. The stock number of each item, as indicated by the Supply Catalog shall be entered in this column on the same line on which the name of the item begins. Items and stock numbers shall be arranged in the exact order in which they appear in the Supply Catalog. The stock class number and name shall be typed at the head of each class of items requested. Two blank spaces shall be left between each class of items.

(e) Item: \_\_\_\_\_. List each item requested, beginning on the same line with the stock number, exactly as listed in the Supply Catalog, except that information contained in parenthesis may be omitted. Indicate the electric current on which electrical apparatus will be required to operate, stating the voltage and type of current (A.C. or D.C.). If alternating current, state also cycles and phase. (Example) 110-v., D.C.; 220-v., D.C.; 110-v., 60 cy., 1-ph). When replacement parts, or accessories, for X-ray, electrically operated, or other equipment is required, and adequate description of the part, and of the equipment item for which the part is required, or with which the accessories are to be used, shall be stated, including the make, model, serial number, part number, or such description as may be available, including electric current date, when indicated, in order to enable the procuring medical supply depot to accurately indentify the material required.

(f) Unit: \_\_\_\_\_. Enter on the same line with the stock number and the first line of the item description, the "Unit of quantity" as stated in the Supply Catalog. "One," "Pair," "Dozen," "Pkg.," "100-gm. bot.," etc.

(g) On hand: \_\_\_\_\_. Enter the quantity of the item on hand as indicated by Record of Public Property and verified by recent inventory.

(h) Enter average complement in space provided.

(i) In the column headed "Minimum Stock" on NMS-Form 4, this should be lined out and the heading "on order not received" substituted therefor, accordingly, should additional stock of any item be requested over and above that which was previously requisitioned and back ordered by the Navy, it is necessary that the quantities so back ordered be reported in this particular column.

(j) Required: \_\_\_\_\_. Enter the quantity of the item required. Care shall be observed to avoid requesting excessive quantities of biologicals, X-ray films, and other similar items which deteriorate within comparatively short periods. When practicable, items shall be requested in packages or case multiples to eliminate unnecessary repacking and handling and to reduce time and cost of issues.

(k) Paging: \_\_\_\_\_. When the listing of items required exceeds one page each page shall be serially numbered near the bottom.

(l) Requisitions shall be signed by the Medical Officer and approved by the Commanding Officer.

(m) Copies designation of: \_\_\_\_\_. The requisitioning activity shall designate the respective copies as follows:

"Original",  
"Commandant"  
"DMO"  
"Second"  
"Third"  
"Fourth"

All copies to be clearly legible.





(n) Prospective movements: \_\_\_\_\_. (Ships and mobile organizations only): Enter name of Port or place at which ship or organization will be located, so far as is known, as indicated by the Form, except when military considerations prohibit such statements.

(o) CORRECTION OF APPARENT ERRORS

If any apparent shortage, over-delivery or other error is found in comparing the medical stores received with the invoice, the medical supply depot issuing the stores shall be informed by letter and requested to ascertain if the discrepancy can be corrected. If the discrepancy cannot be verified as occurring at the issuing depot, and corrected, the stores shall be taken up as invoiced, and adjusted on the books of the receiving activity. A notation indicating the nature of the discrepancy shall be included in the receipt endorsed. The receiving activity shall make no change or alteration in an invoice except when requested to do so by the issuing medical supply depot. Medical stores lost in transit shall be taken up by the activity to which invoiced and a property survey prepared to cover material lost or missing. (Art. 1164 W.R.) (Art. 1600 M.T.).

  
C.J. MC DEVITT, Senior Surgeon, USPHS.  
District Medical Officer.



RESTRICTED

RESTRICTED

NOTES ON CLERICAL PROCEDURES, MEDICAL ACTIVITIES,  
U. S. COAST GUARD

Although clerical procedures constitute a secondary item in medical activities, nevertheless the importance of securing uniformity and accuracy in medical records cannot be too strongly stressed. The primary purpose of any medical unit in an organization is to keep personnel well and in a duty status. In order to do this, complete and accurate records of past events ~~is~~ an essential. Before going extensively into the topic of clerical procedure, it might be well to get a fair understanding of the U. S. Coast Guard as an organization.

The Coast Guard is a service in the Navy Department either in the time of war or when so directed by the President of the United States. It is administered by the Commandant of the Coast Guard. Although the Coast Guard is, in many respects, similar to a Navy Bureau, it is different in that it is a self-contained military organization with its own Engineering, Personnel, Finance, and other logistic activities. While the bureaus and offices of the Navy Department ordinarily have no direct responsibility for the administrations of the various functions assigned to the Coast Guard, close liaison is maintained at all times between the Coast Guard, and these Bureaus and offices of the Navy Department. In the field, the boundaries of the Coast Guard districts coincide to a considerable degree with those of the Naval districts. Many Coast Guard vessels are assigned to Navy fleets. Other Coast Guard operating vessels are assigned to the Naval District Commandants, under their direct control although administered by the District Coast Guard Officer on their behalf, with respect to the remaining operating in the various logistic activities. The District Coast Guard Officers are also under the military control of the corresponding Naval District commandants, although on the detailed administrations of their districts, they report directly to the Commandant of the U.S. Coast Guard. The procedures and practices of the Service are based on approved regulations and publications issued by the Commandant. These practices are outlined in such publications as "Regulations, U. S. Coast Guard", "Pay and Supply Instructions, U. S. Coast Guard", "Personnel Instructions, U. S. Coast Guard" and such changes as are issued from time to time in the modification of these publications. These publications should be used as a constant reference in order to understand more thoroughly the reasons for the established routine of the Service.





The basic organization plan for district offices is generally a counterpart of the Headquarters' organization. District Coast Guard Officers are given staff assistants for an organization which operates much in the same manner as the offices and divisions of Coast Guard Headquarters. Under the DCGO the staff officers are responsible insofar as the particular district is concerned for planning and directing the performance of the basic operations of the Coast Guard in their particular districts. These activities are conducted within the framework of Headquarters plans and are adjusted to meet the local circumstances existing in the district. One of the staff officers is the District Coast Guard Medical Officer.

Under the general direction of the Assistant District Coast Guard Officer, the medical officer administers or supervises the administrations of the personnel of medical activities in a district. One of the many duties of the District Medical Officer is, "Be assured that required medical records are kept." Upon the medical officers and enlisted men of the medical activities of the Coast Guard depend largely the supervision and performance of the clerical work required. The lower ratings have a primary duty that concerns care of the sick and injured. As these primary lower ratings advance, they must become more familiar with the clerical duties of their department and when assigned to such duty must assume responsibility for the accuracy of the records of their department. With this object in mind, the following summary covering clerical administration is furnished for the guidance of personnel concerned with medical activities in the Coast Guard.

The primary purpose behind medical records is protection. Protection for the individual and protection for the service, and each time record is made for any reason this primary thought should always be kept in mind. The data contained in various reports, in addition to serving the primary purpose, is used for statistical purposes as well as to answer inquiries at later times, either by Headquarters or by the District Coast Guard Officers to either individuals or other Government departments. All of these efforts have to do with protection of some form or another. It can be easily understood, therefore, why these records must be concise, accurate, and permanent. The word "Form" has been applied to designate many of these records and for the most part, the word "Form", numbered "this" or lettered "that" will soon become common knowledge to all. Different reports and returns are so identified and the use of some of these will be explained separately herein.





When a civilian wishes to enter military service in the U. S. Coast Guard, he must, among other things, undergo a rigid physical examination. "Instructions for Medical Officers Relative to Physical Examinations, U. S. Coast Guard" is used as a guide in this respect for the medical officers doing physical examinations for the U. S. Coast Guard. The applicant has his name recorded on an outpatient card (Form 1971-E), data pertinent to his physical condition is listed on this card. If he passes the physical examination, a health record is opened in his case (Form 2525). The health record is prepared and kept in accordance with the general instructions inside the cover. Each of the separate sheets contain letters following the number of the form, A-B-C, etc. As the recruit moves through the channels of the Service for medical care, an outpatient card is made at the dispensary or clinic for each separate condition for which he is treated. Any absence from duty and any condition that may effect his future service in any way is posted on the medical history sheets in the health record. These entries are signed by the person authorizing the absence or giving the treatment as the case may be. At the end of each month, units with medical officers or pharmacist's mates are required to prepare and submit a recapitulation of all treatment furnished Coast Guard personnel in a monthly "Report of Medical Relief" (Form 2523). Instructions for the use of this form is also printed on the reverse thereof. At the end of each month also each separate command is required to submit a monthly "Report of Absence on Account of Sickness" (Form 2524). This form should contain the names of all personnel who perform no duty on account of sickness during the month for which it is submitted (binnaelo list, hospital cases, and absence on account of sickness). Medical certificates, "Application to the U. S. Public Health Service for Relief for the Personnel of the U. S. Coast Guard", (Form 2522) are required to be submitted by units with medical officers on all personnel absent due to sickness (except sick leave following hospitalization on the recommendation of a physician). These certificates, finals only, are also required in case of personnel treated as outpatients for a venereal disease. All personnel must present these forms at activities of U. S. Public Health Service. When physical examinations are requested from medical officers who are not attached to the same command as the patient, "Request for Physical Examination" (Form 2501) should be prepared and accompany the person to the medical officer. Dependents of personnel are entitled to medical care if the person is wholly dependent on the Coast Guard member for support (wife, children, and dependent relatives, etc.). "Application to U. S. Public Health Service for Treatment of Coast Guard





Dependents" (Form 2534) is utilized for this purpose. In connection with the reports of communicable diseases, weekly reports of communicable diseases are made to the District Coast Guard Officer; and venereal disease contact forms are submitted on each new case of venereal disease by the medical officer. The Service has a definite responsibility in assisting in the control of communicable diseases, and it is required by law to make certain reports in this regard.

All Service correspondence, as well as reports and returns, follow a definite pattern. This pattern is outlined in Chapter 24, "U. S. Coast Guard Regulations", "The Stenographers' Guide", and the "Yeoman's Manual". Correspondence shall be minimized as much as is compatible with the public interests, both as with regards to the number of letters and length thereof. Accuracy, simplicity, and conciseness are essential, information shall be imparted, reports and requests made, and questions asked directly. Communications shall not contain introductory or ceremonial forms such as, "I have the honor", "Information is respectfully requested", "It is directed that you", and "Respectful consideration". The chain of command shall be rigidly adhered to in routing Service correspondence. Supplies of all kinds are purchased for the use of the Service and proper records of their acquisition, use, and disposition must be made. It is suffice here to mention that when service units acquire supplies and/or services from both units of the same Government department, or from other Government departments, these supplies are passed back and forth on acceptable requisition forms and receipted for by officers of the departments effected. The common form used in the U. S. Coast Guard between units is "Requisition and Invoice" (Form 2556). Permanent records must be kept of all property in the form of a record of public property. In addition to the many reports and returns required in Service operations by the Coast Guard, many other government services are quite frequently contacted for one service or another. This brings into play certain forms for reports of the Service effected. The more familiar ones for medical activities are those used by the U. S. Army, Navy, and Public Health Service, and the standard forms used by all Government services. Special study should be given to the use of these report forms as the need arises for their use. These report forms all fill a definite job in routine operations of the other service organizations and demand the same amount of careful preparation as the more common ones used by the U. S. Coast Guard.





DIAGNOSIS

The diagnosis of acute appendicitis is based upon a possible history of preceding attack, and such possible prodromal symptoms as malaise, headache, anorexia, constipation or diarrhea the day preceding the attack of pain which is usually epigastric or perumbilical at onset and may be described as "cramp like" in character. The pain usually localized in the right lower quadrant within 12 hours, and nausea coming on soon after the attack of pain accompanied by vomiting 1 to 3 times. The vomitus is described as previously ingested food, and such physical findings as: temperature elevated from 99.5 to 100°F, tenderness and rigidity most marked over the area of pathology, usually McBurney's point, and auscultation over the abdomen may reveal diminution of peristaltic sounds, and such laboratory findings as

Blood----Leucocytosis 10 to 12,000.

Urine----Usually normal.

DIFFERENTIAL DIAGNOSIS:

The differential diagnosis considers:

(1) Ruptured peptic ulcer, diagnosed on a possible history of previous periodic food distress with pain coming on 2 to 3 hours before meals with soda and temporary food relief, and such symptoms as sudden onset of lancinating agonizing pain in the epigastrium which causes patient to double up and cry out. Nausea and vomiting may occur 1 to 2 times, and such physical findings as, tenderness, which is most marked in both upper quadrants and exquisite over the epigastrium, and later diffuse throughout the abdomen, and rigidity described as "board like" throughout the abdomen, and obliteration of liver dullness may be present and temperature of 99 to 100°F or may be subnormal. The pulse is slow early, and auscultation reveals the "silent abdomen", and such laboratory findings as:

Blood----Leucocytosis 10 to 14,000.

Urine----Usually negative.

X-ray----May reveal pneumoperitoneum.

(2) Acute cholecystitis which is diagnosed on a possible history of previous qualitative food distress, and possibly previous attacks of gall bladder colic, and the occurrence in the "fair, fat and forty" group, and such symptoms as acute onset of pain in the right upper quadrant, which may be described as a diffuse ache or of sharp boring quality, or may be associated with typical gall bladder colic, with nausea and vomiting repeated many times. The vomitus may be described as yellow to greenish in color and usually odorless. The temperature may be 102 to 104°F, or may be normal or subnormal, and chill may have occurred. Physical findings may be tenderness in the right upper quadrant which may be exquisite over the gall bladder area, or there may be a "residual soreness" and a palpable mass may be present in the gall bladder area. Subicteric tint may be present in the skin and sclera, and such laboratory findings as:

Blood----Leucocytosis of 18 to 30,000.

Urine----May show bile.

X-ray----May reveal shadow of stone.





Other conditions to be considered are:

1. Pelvic inflammatory disease.
2. Renal colic
3. Torsion of tumor on pedicle.
4. Diverticulitis.
5. Perforation of malignant tumor.
6. Osteomyelitis of ilium.
7. Seminal vesiculitis.
8. Penetrating peptic ulcer.
9. Acute intestinal obstruction.
10. Tabetic crisis.
11. Pneumonia, etc.

### COMPLICATIONS

The most common complications of acute appendicitis are abscess formation and diffuse peritonitis.

### TREATMENT

The treatment is essentially operative. Preoperative treatment consists of low enema, morphine sulphate gr.  $\frac{1}{4}$  and atropine gr.  $\frac{1}{150}$  and gastric lavage, if vomiting has been frequent.

The incision, right rectus, paramedian or McBurney. If palpable mass is present, operative incision may be made above the mass for the best possible exposure.

Before an abscess has formed, appendectomy and primary closure of wound without drainage (drain may be inserted in subcutaneous fat),

The treatment of acute appendicitis that has progressed to abscess state, usually 72 hours from onset of attack, is conservative and the Ochsner management instituted: 1. Fowler's position, 2. Nothing by mouth, 3. Fluids subcutaneously or intravenously, 4. Ice bag to lower right quadrant, and 5. Morphine sulphate p.r.n. under careful observation. These cases may resolve and then "interval appendectomy" may be performed at the end of 6 to 8 weeks.

The indications for operative intervention in case of appendiceal abscess after the 3rd. day following initial onset are: 1. Spread of abscess, which is manifested by increase in size of palpable mass, 2. Elevation of temperature and pulse rate, 3. Increase of toxicity of patient, and 4. Evidences of beginning ileus.

Extra-peritoneal drainage may be done. If the appendix presents in the abscess cavity and can be removed without breaking down abscess wall, it should be removed.

Postoperative treatment consists in fluids subcutaneously, recta tap, morphine and careful observation for postoperative complication such as: 1. Wound infection, 2. Hemorrhage, 3. Abscess (pelvic or liver etc), 4. Fecal fistula, 5. Postoperative pneumonia, 6. Post-operative collapse of the lung, 7. Pyelophlebitis, 8. Thrombophlebitis, 9. Mesenteric thrombosis, 10. Septic infarction of the lung. etc.





157

DEFINITION: General suppurative peritonitis is an exudative, suppurative inflammation of the general peritoneal surface.

ETIOLOGY: includes the following:

PREDISPOSING FACTORS

Age: It occurs most frequently between 20 and 50. Is rare before the age of 6 or after 60 but may occur.

Sex: It is more common in females than in males because the former are predisposed to more infections in the abdominal cavity. Extremely important are:

Previous Diseases

Among which may be mentioned appendicitis, pelvic infections, tuberculous peritonitis, tuberculous enteritis, herniae, typhoid fever, dysentery of various types, upper respiratory infections such as tonsillitis, particularly in children pneumonia and influenza, The

EXCITING CAUSE:

May be bacterial, chemical, mechanical or physical.

Of Bacterial Origin-from infected abdominal viscera.

Appendix-through perforations, rupture or gangrene.

Female Pelvic Organs-gonorrheal salpingitis, puerperal sepsis, septic abortion, ruptured ectopic pregnancy, tuberculous salpingitis.

Biliary Tract-Cholecystitis, cholelithiasis and cholangitis.

Stomach and Duodenum-Ulcers, carcinoma, phlegmonous gastritis and ulceration of foreign bodies.

Intestine-Perforation of ulcers, typhoid, dysentery, tuberculous, carcinomatous, or non-specific.

Diverticulae-Meckel's diverticulum and suppurative diverticulities of the colon.

Foreign Bodies in the Intestine-gall stones, parasites, operative instruments, etc.

Pancreas-Acute hemorrhagic pancreatitis of the various types.

Liver-Solitary or multiple abscess, specific and non-specific and cysts-echinococcus and hydatid.

Contamination from adjacent suppurative food. Subphrenic abscess, psoas abscess, pelvic abscess, lymphatic glands and occasionally abscess of the abdominal wall.

Trauma-Gunshot, stab wounds, penetration of foreign bodies and crushing injuries of the abdomen.

Blood Stream-Sore throat, pneumonia, influenza, septicemic causes, but it must be remembered that theoretically that any focus may be in the body.

Non-Bacterial Causes

A. Chemical-Gastric juice, bile, intestinal juices, urine, blood, cystic fluid, saline solutions, glucose solutions, and antiseptic solutions as Dakin's. All of these factors add by reducing the normal resistance of the peritoneum and allowing bacteria which migrate through the walls of the intestines or extraneous organisms to gain a foot hold.





B. Mechanical-drying of the peritoneum, sponging and handling. All of these factors damage the mesothelial layer of the peritoneum and predispose it to secondary bacterial invasion.

C. Physical-X-Ray, radium, actinic light, heat, electricity, etc.. An average overdose or a prolonged action of these factors may produce a peritoneal reaction.

### THE PATHOLOGY OF GENERAL SUPPURATIVE PERITONITIS

Is essentially the same as "inflammation anywhere else in the body". The

#### PATHOGENESIS

is as follows. The condition is rarely general from the beginning, but there is a spreading of the inflammation from a causative focus to the general peritoneal cavity. The general spread of the infection depends upon the suddenness of the initial infection, the virulence of the organisms the condition of the patient and improper treatment. The

#### PATHOLOGICAL COURSE

includes the following steps. At first there is a hyperemia of the vessels of the bowel wall and of the mesentary. This is followed by exudation. The character of the exudate depends upon the type of organism and the resistance of the patient. It may be serous, serosanguinous, serofibrinous, or seropurulent. In a streptococcus infection, for example, the exudate remains serosanguinous with hardly an attempt at fibrin formation. When the infecting organism is less virulent, there is a coagulation of a portion of the exudate into a plastic lymph which covers the locally damaged peritoneum about the region of the infection. Occasionally, this plastic exudate will be able to seal off the pathway through which the organisms are invading the peritoneum. Occasionally organization of this plastic exudate with the implication of loops of bowel, omentum and mesentary may be sufficient to wall off the infection, with the formation of a localized peritonitis, or if suppuration still occurs within these plastic walls, a localized peritoneal abscess. Multiple abscess pockets of this kind may be formed, resulting in general areas of local peritonitis, in contradistinction to a general peritonitis.

In general suppurative peritonitis localization of the infection does not occur. The entire peritoneal surface becomes involved. Continued exudation with little tendency to the formation of a plastic exudate results in the diffusion of a purulent fluid throughout the abdominal cavity. Absorption occurs thru the undamaged peritoneal surface, thru the blood stream but to the greatest where the lymph supply is greatest, namely, in the upper part of the abdomen.

#### ASSOCIATED PATHOLOGICAL CONDITIONS

Paralytic Ileus-occurs reflexly or through the diffuse peritoneal damage. Pathologically the ileus of general suppurative peritonitis is exactly the same as paralytic ileus





from other causes. Suffice it to say that it is probably of a protective nature to prevent the spread of peritoneal contamination such as would occur if peristalsis were active.

Toxemia-Occurs because of the absorption of the peritoneal exudate and absorption of the contents of the paralyzed bowel.

Toxic Changes in the Parenchymatous Organs

are the same as any other severe infection. These changes occur principally in the liver, kidneys, spleen and pancreas.

Blood

shows an increase in the non-protein nitrogen, a decrease in the blood chlorides, and increase in the viscosity. Vomiting and fluid and chloride depletion occurs not only because of the peritoneal involvement but also because of the paralytic obstruction.

#### COMPLICATIONS OF GENERAL SUPPURATIVE PERITONITIS.

Death-occurs because of the toxic absorption and collapse.

Formation of Local Abscesses-which may be pelvic, par-appendicular, subphrenic, and less frequently isolated abscess in the free abdominal cavity.

Adhesive Peritonitis with Obstruction is extremely important.

Thrombosis of the mesenteric vessels.

Thrombosis of the iliacs.

Metastatic Emboli with their complications.

Toxic Nephritis.

Toxic Hepatitis.

Septicemi.

Pyemia.

Production of Intr-abdominal and external Fistulae.

#### SYMPTOMS OF GENERAL SUPPURATIVE PERITONITIS-are ordinarily

secondary to the symptoms of the etiological condition and may at first mask the peritoneal symptoms. When developed the symptoms of peritonitis are:

Abdominal Pain-which is acute and diffuse in character, at first colicky or intermittent, but as the condition progresses, persistent.

Nausea and Vomiting-are persistent first from the diffuse peritoneal irritation and later from the paralytic ileus.

Tenderness and Rigidity-are present throughout the entire abdominal surface.

Temperature-increases from the onset and varies from 101 to 103 or upwards, reaching an abnormal point.

Pulse-is rapid, from 120-140 and is characteristically full and of a hard bounding quality, until there is collapse of the cardiovascular system, when it is rapid and thready.

Abdominal Distention-is progressive and diffuse. It becomes more marked as paralytic ileus develops.

Absence of Peristalsis-or the so called "silent abdomen" is of suppurative peritonitis in the paralytic stage.

Leucocytosis-may vary from 15-40,000 depending upon the resistance of the individual and the Virulence of the infective organisms.





Appearance of the Patient- is characteristic. He is restless, assumes an anxious expression, face pinched, eyes sunken, bright, cheeks become sunken with hectic flush and there may be a circumoral cyanosis. This is known as the typical peritoneal facies.

#### TREATMENT OF GENERAL SUPPURATIVE PERITONITIS

has for its objectives: The removal of the infective focus where possible, drainage insofar as is possible of the peritoneal exudate, dilution of the toxins circulating in the blood and lymph stream and support of the patient.

Supportive Treatment-consists of

Administration of Fluids-in the form of flat solution and glucose solution given intravenously and subcutaneously. Fluids dilute the toxins, reestablish the water and salt balance and supply nourishment. The amount of fluid given depends upon the ability of the cardiovascular system to withstand it. Ordinarily, from 3-5,000 cc. is needed in 24 hours. Fluids by mouth are contra-indicated because of the danger of increasing peristaltic action and thus spreading the infection; because of the fact that they increase the tendency to vomiting because of lack of passage dilatation of the stomach and reverse peristalsis; and because of the presence of paralytic ileus, in which condition they are of course contra-indicated.

Support of Cardiovascular System-is indicated because of its depressed condition by the toxemia and also to preserve the only avenue of dilution of the toxins. Stimulation should be of the general ascending type.

Support of the Nervous System-is important because of the restlessness which accompanies the severe toxemia. Bromides, chloral, and luminal are preferable to morphine, which is contra-indicated because it favors the production of a paralytic ileus by promoting intestinal quietude; because it reduces the individual's resistance to infection, and because it masks the occurrence of complications. When morphine is used, it should be used in small quantities.

Position of the patient-is important to lessen the amount of absorption of the peritoneal exudate. Because peritoneal absorption is the least in the pelvis, the patient should be placed in a Fowler's position, unless there is some special contra-indication.

Surgical Treatment-consists of the removal of the infective focus which may mean closure of the perforation; removal of such suppurative infections are drainage thereof of appendix, gall bladder, diverticulae, tubes, etc., drainage of localized abscesses which may contaminate the general peritoneal cavity through leakage.

Drainage-of the entire abdominal cavity is essentially an impossible procedure due to the various subdivisions but insofar as is possible drainage should be free and dependent, as far from a position of rich lymphatic absorption as possible.

Treatment of Complications-is principally the treatment of paralytic ileus which consists of placing hot packs to the abdomen, nasal catheter for leavage and deflation, frequently using rectal tube and enemas to diminish abdominal distention pituitrin and eserin in quantities sufficient to increase the tone of the bowel musculature, but not sufficient to increase peristalsis and finally emergency enterostomy or jejunostomy.





161  
DIFFERENTIAL DIAGNOSIS OF ACUTE ABDOMEN

DIVERTICULITIS OF THE INTESTINE

occurs only in Meckel's diverticulum, which is located in the terminal 12 inches of the small intestine; and in the sigmoid colon. A diverticulum may produce an acute abdomen which resembles acute appendicitis in Etiology, pathology, symptoms, Diagnosis and treatment. The possibility of Meckel's diverticulum and diverticulitis of the colon should always be kept in mind when upon opening the belly the appendix is found normal.

SYMPTOMS IN DIVERTICULITIS OF THE SIGMOID

are similar to those of appendicitis except that they are transferred to the left side of the abdomen.

The Onset

is acute but there may be a history of left lower quadrant pain associated with alternating constipation and diarrhea with the occasional appearance of blood or mucous in the stool. The patient may give a history of having been treated for mucous or ulcerative colitis, high stricture of the rectum, or internal or external hemorrhoids.

Pain-is usually generalized at the onset with localization in 6-12 hours in the left lower quadrant. It is sometimes localized from the start.

Nausea and Vomiting-may follow pain.

Tenderness and rigidity-present in the left lower quadrant of the abdomen. Tenderness is most marked deep down below the anterior superior spine in the region of the colon.

A Mass-may sometimes be felt at the point of greatest tenderness. This seems to arise from the pelvis.

Rectal Examination-will reveal an extremely tender immovable mass which may be located at the recto-sigmoid juncture or in the posterior cul-de-sac and seemingly attached to the bowel. Often the lumen of the bowel will be found narrowed to the examining finger.

Temperature-is usually from 100 to 101, and,  
Leucocyte Count-is anywhere from 15 to 30,000.

MESENTERIC THROMBOSIS AND MESENTERIC EMBOLUS

generally occur in individuals about 55 years of age, is generally associated with hyper-tension, organic heart disease, arteriosclerosis and is frequently seen in association with debilitating conditions following long periods of rest in bed. It is more often seen in males than in females.

The Onset-is sudden with,

Diffuse Abdominal Pain-which is at first colicky in nature later becoming persistent.

Tenderness and Rigidity-is diffuse over the abdomen but is perhaps most marked over the immediate neighborhood of the pathology.





162 16  
Nausea and Vomiting-is persistent and finally approaches the type seen in intestinal obstruction.

Stools-frequently contain either dark or fresh blood mixed with mucous. If there is no spontaneous passage, this finding may be seen after an enema.

Progressive Distention-occurs because of the paralytic ileus which ensues.

Temperature-may be normal or subnormal at the onset, but it gradually rises as the peritoneum becomes involved.

Leucocyte Count-is normal at the onset, but rises gradually.

Splenic Infarct-in subacute bacterial endocarditis may give rise to a condition which simulates an acute abdomen.

The diagnosis of subacute bacterial endocarditis is based on the history of previous cardiac involvement, septic temperature, positive blood culture, low leucocyte count, petechial hemorrhages into the skin, and mucous membranes, pallor due to the secondary anemia, loss of weight, and embolic phenomena as splenic infarcts.

Among the intra-abdominal conditions producing the picture of an acute surgical belly are several gynecological conditions.

ACUTE GONORRHEAL SALPINGITIS-is the most important of these conditions. This may be primary attack or an exacerbation of a chronic infection.

Onset-is acute with,

Pain-which is sharp and knife-like throughout the lower abdomen, accompanied or not by,

Nausea and Vomiting

Tenderness and Rigidity-is diffuse but is most marked over the lower quadrants.

Stigmata of Gonorrhea-are present. There may be a skenitis or bartholinitis. There is a redness of the urethral and vaginal orifices, with a mucopurulent discharge.

Vaginal examination-reveals tenderness in both fornices. The latter are lowered and there is a thickening of the vaginal vault. There are palpable masses in the posterior cul-de-sac in association with a fixed uterus in posterior retroversion. The latter finding is more common in old cases.

Laboratory Findings-include,

Smears-which should be made from the cervical and not the vaginal secretion. A negative smear however, does not rule out the possibility of gonorrheal salpingitis.

Complement Fixation Test -may be used, but the results, are unsatisfactory in many cases. A negative complement fixation test should not rule out the possibility of specific pelvic infection.

Temperature-is ordinarily high in comparison with the subjective symptoms and ranges from 102 to 104.

Leucocyte Count-is high and may be 30,000 in hyperacute cases.

History-is important, but a negative history of exposure should not rule out the possibility of gonorrheal salpingitis.





PELVIC PERITONITIS-post-partum or following an induced or spontaneous abortion produces the picture of an acute abdomen.

Onset-in these conditions is not as acute as in gonorrheal pelvic infections. The symptoms frequently come on slowly over a period of 24-36 hours.

Nausea and Vomiting-may occur due to the peritoneal irritation.

Tenderness and Rigidity-over the lower half of the lower half of the abdomen, diffuse in character is present.

Temperature-is out of all proportion to the subjective symptoms and findings and may range from 102-105F.

Leucocyte Count-is high.

Vaginal Examination-may reveal a serous, serosanguinous or seropurulent discharge which may be odorous or not. There is extreme tenderness in both fornices with rigidity of the vaginal vault and pain on manual movement of the uterus. There are no masses.

The Course-frequently leads to a general suppurative peritonitis which is often associated with the septic symptoms of a blood stream infection.

#### RUPTURED ECTOPIC PREGNANCY:

History-is of extreme importance in these cases. Ordinarily, there is amenorrhea of one or two months duration. The last menstrual period may have been irregular. There may be a history of spotting for a period of three weeks to two months previous to the onset of acute symptoms. There may or may not be a history of previous infection.

Onset-is that of a n abdominal catastrophe without any prodromes.

Pain-is located on the right or left lower quadrant of the abdomen, sharp and lancinating in character, and may be persistent or intermittent in character.

Nausea and Vomiting-may or may not occur. Immediately following pain come,

Symptoms of Collapse and Hemorrhage-Pallor becomes progressively greater. Other symptoms are weak, rapid, throaty pulse, cold clammy sweat, restlessness and air hunger. These symptoms may progress to a fatal termination or may subside.

Tenderness and Rigidity-is present in the lower abdomen, most marked on the affected side.

Vaginal Examination-will reveal a tender fornix on the affected side through which by bimanual examination may be palpated a soft tender mass which seems to be connected to the pelvic viscera. A slight bloody show may appear. The uterus is frequently enlarged to the period corresponding to the stage of the pregnancy reached in the tube. The cervix is soft and the body of the uterus is spherical and soft. Hegar's sign may or may not be present.

OTHER OBJECTIVE FORMS OF PREGNANCY-may be found on general examination.

Temperature-at the onset may normal or subnormal, and will not rise until absorption of blood from pelvis occurs.

Leucocytosis-may be high, due to hemorrhage.





167

ACUTE APPENDICITIS

Gives the picture of an acute abdomen.

The Onset-is sudden with,

Pain-which is sharp and knife-like, and generally limited to the lower abdomen, on the affected side.

Nausea and Vomiting-occurs because of the peritoneal irritation and may be persistent. There is

Tenderness and Rigidity-most marked in the lower abdomen on the affected side and very frequently there is a

Palpable Mass-which is tender and which seems to arise from the pelvis.

Vaginal or Rectal Examination-will confirm the presence of the mass.

Temperature-may be normal, sub-normal, or slightly elevated.

Leucocyte Count-is normal or slightly elevated.

In the further differential diagnosis of the acute abdominal conditions, we must consider certain extra-abdominal conditions which are of extreme importance. Those arising from kidney affections are extremely important.

PYELITIS-may closely simulate an acute abdomen. It is seen most frequently in children, but may occur in individuals of any age. It is more comparable to appendicitis than to any other acute abdominal condition.

Onset-is sudden and may or may not be associated with a

Chill-chilly sensations or a frank rigor.

Pain-which may be generalized over the abdomen at first localizes on one side or the other. There is

Tenderness and Rigidity-over the corresponding half of the abdomen, but while this is true tenderness and rigidity over the costovertebral angle on one or both sides is marked, especially by Murphy percussion.

Nausea and Vomiting-may be an associated symptom. Frequently there is

Frequency and Burning-on urination.

Temperature-is usually higher than one would associate with the same symptoms coming from the belly and usually ranges between 103 and 104. The same is true of the

White Count-which ranges from 20 to 25,000.

Urine-will show pus cells which may come in showers, occasionally red cells, with a trace or not of albumin.

A catheterized specimen should be examined.

Cystoscopic Examination-will confirm the diagnosis.

RENAL COLIC-characteristically has an

Acute Onset-with

Pain-which is sharp and stabbing in character and referred down to the scrotum and medial side of the thigh. In typical cases pain may simulate abdominal pain. Following pain, there is frequently

Nausea and Vomiting-are usually associated symptoms.





165  
Tenderness and Rigidity-may or may not be present, posteriorly over the affected kidney and may also be present anteriorly on the affected side.

Temperature and Leucocyte Count-depend upon the amount of associated infection.

Urine-shows blood cells and perhaps albumin.

X-Ray-may or may not reveal a stone.

Cystoscopic Examination-and pyelography will isolate the affected kidney.

ACUTE NEPHRITIS-sometimes gives the picture of an acute belly. In such instances the

Onset-is sudden with,

Pain-which is generalized over the abdomen and of a steady persistent nature. This may be associated with

Vomiting

Tenderness and Rigidity-diffuse over the abdomen may be present.

Distention-and other symptoms of paralytic ileus occur.

Pulse-is rapid but does not have the bounding quality of peritoneal irritation.

Temperature-is frequently high.

Leucocyte Count-usually ranges from 15-30,000.

The Urine-has a high specific gravity. Is highly colored, contains albumin, hyaline and granular casts, blood cells and white cells, it must be remembered however, that such urinary findings are frequently associated with any acute abdominal condition because of the secondary toxic effect on the kidneys.

URETERAL STRICTURE-may produce unilateral cramp-like abdominal pain which if located on the right side, may give symptoms which are very closely related with an acute appendicitis. Unless infection is present, in the kidney, the condition is generally afebrile. The diagnosis is made cystoscopical by ureteral catheterization.

Upper-respiratory conditions must often be differentiated from an acute surgical belly. Among these are:

LOBAR PNEUMONIA-particularly of the central type is important.

The Onset and Course-during the first 24 hours may be typical of an acute abdomen, with the first symptom being

Pain-which is generalized over the entire abdomen with no tendency to localize, but which may be exaggerated with the patient lying on his right side, when the pneumonia is on that side.

Vomiting-may or may not be an outstanding symptom.

Tenderness and Rigidity-is diffuse over the entire abdomen, but is perhaps most marked on the side of the coming pneumonia.

Temperature-is frequently higher than in most acute abdominal conditions and will average 101 to 104.

Leucocytosis-of from 15-25,000 is present.





16

Physical Findings-in the chest alone may establish the diagnosis. These may not have developed sufficiently at the time of the initial examination to be detected, which is particularly true in a central pneumonia. Early we find only roughened breath sounds, moist clicking rales with little or no impairment of resonance. Such findings in one or both cases should make one suspicious. X-Ray and fluoroscopic examination of the chest may be of value at this stage in showing early infiltration in the lung field. When the pneumonia is developed, the abdominal manifestations ordinarily recede to some extent, and the typical physical findings of pneumonia are present.

TONSILLITIS-in children, particularly when due to streptococcus, may produce the picture of an acute belly. Such a picture may appear during the course of an acute sore throat or as a sequel. An abdominal condition following a sore throat is not a reflex condition, but it is a metastatic peritonitis. Consequently, the symptoms from the onset are those of a diffuse peritoneal involvement, with persistent diffuse abdominal pain, vomiting, diffuse tenderness and rigidity, distention of the abdomen, high temperature and a leucocytosis. The differential diagnosis is made by eliminating other possible factors within the belly which may cause a diffuse peritoneal involvement. A history of a recent or coexistent sore throat helps in arriving at a diagnosis.

DIAPHRAGMATIC PLEURISY-has practically the same onset as an early pneumonia, and may also simulate an acute abdomen. Pain is increased by respiration is of a sharp stabbing nature, and seems to be referred to the abdomen rather than to originate there. Rales in the chest and a friction rub should call ones attention to the condition. One must be extremely careful in diagnosing an upper respiratory infection which simulates an acute abdomen, because of the danger of aggravating the respiratory infection with the general anesthetic. On the other hand, it should be remembered that acute abdominal conditions are frequently complicated by an upper respiratory infection particularly a pneumonia. An upper respiratory infection may co-exist with an acute abdominal condition.

Certain cardiac conditions must be differentiated from an acute abdomen.

CORONARY THROMBOSIS-is one of the important of these conditions. The disease characteristically begins with sudden agonizing pain which is usually substernal, frequently radiating to the left arm. In some cases, however, it is referred to the upper abdomen when it resembles such acute abdominal catastrophes as acute pancreatitis, perforated peptic ulcer, etc. Fever is





moderate. A to and fro friction rub is usually present. Varying degrees of cardiac decompensation are present. Cardiac Decompensation-occasionally will produce a picture of a milder grade of acute abdomen due to the engorgement of the liver and portal circulation.

PEPTIC GASTRIC CRISIS-is one of the most important conditions to differentiate from an acute abdomen. Pain-may be generalized over the abdomen or located in the epigastrium. It is intermittent, cramp-like in nature and associated with an extreme sense of abdominal constriction, the so-called "girdle" or band sensation. Neusea and Vomiting-are frequent. Tenderness and Rigidity-is diffuse over the abdomen, but most marked in the epigastrium. There may be slight abdominal distention. Temperature and Leucocyte Count-are generally normal. Important in the diagnosis is the History-of infection or of treatment of syphilis and Typical signs and Symptoms of Tabes-together with other stigmata of syphilis.

ACUTE LEAD POISONING-presents the picture of an acute abdomen, particularly resembling spastic ileus. The history or exposure to lead is important. Increasing constipation, paresthesias anesthesias and other symptoms of neuritis are important. Other signs of lead poisoning are lead line, marked secondary anemia, stippling of the red cells, and appearance of lead in urine and feces on examination. Other conditions to be differentiated are acute epididymitis tuberculous caries of the spine biliary colic, ruptured peptic ulcer, acute appendicitis, acute pancreatitis, etc.





## BURNS

168

THESE INJURIES are so common and lead so frequently to disabling deformity or to loss of life, as to constitute perhaps the most important cause of gangrene and ulceration. There may be said to be three clinical aspects of a burn:

1. the initial shock of the injury itself
2. the toxic reaction due to the absorption of poisonous products of the burned tissues.
3. the residual ulceration.

The shock of an extensive burn may be very severe and may be rapidly fatal even before the secondary toxic effects begin to show themselves. In such instances, the patient is usually beyond aid, but less fatal states, betrayed by pallor, sweating and a wide-awake consciousness rapid shallow respirations, a feeble rapid pulse and low blood pressure are not uncommon.

The toxic manifestations begin to appear within 12 to 24 hours of the injury. It has been demonstrated experimentally that within this period and for the following 24 hours, substances in the nature of nucleoproteins are formed in, and absorbed from, the burned tissues which in themselves, and without regard to sepsis, are remarkably poisonous. Once absorbed, these substances, if formed in sufficient quantity and if not removed from the blood stream, are likely to cause death. The toxemia is marked by high fever, a rapid, feeble pulse, restlessness, drowsiness, a tendency to convulsions, and suppression of urine. The blood becomes highly concentrated, owing, perhaps, to an excessive surface exudation or edema. Occasionally, in children especially, early in the toxic stage, or later, in that of sepsis, Curling's ulcer of the duodenum occurs and leads to dangerous if not fatal hemorrhage or to perforation. Even if discovered promptly such a lesion is most difficult to treat.

The toxemia of burns corresponds roughly to their extent and intensity.

1. A burn of the first degree shows a reddened skin, lightly blistered, and is dangerous only if extensive, notably in children.
2. A burn of the second degree is represented by sufficient reddening and blistering to warrant the belief that by a coagulative process, much of the epidermis will have been destroyed, but patches or even considerable areas of the deep skin from which a new epidermis may subsequently and under favorable circumstances be created remains. Such burns are very dangerous indeed.
3. A burn of the third degree is revealed by such charring as to make it clear that the whole skin and perhaps the underlying connective tissue is destroyed. The skin may actually be blackened by fire over considerable areas, but an ivory white-ness due to intense dry heat





to boiling liquids or steam, may represent a deep necrosis which is similar in its effect and will subsequently become black. It is usually held that combined second and third degree burns of more than one third of the body's surface are almost certain to be fatal. Deaths may occur from burns of much smaller areas.

The ulceration resulting from destruction of the skin varies in its nature in accordance with the number of islands, of skin which may be left to initiate epithelial regeneration, and with the depth general, the deeper the burn and the slower the initial repair, the thicker the scar and the more bloodless and unhealthy its surface. Infection adds yet more destruction and increases the depth and extent of the cicatricial tissue. For such reasons burns, are prone, above all other injuries, to result in deep, contracted, deforming scars. New skin is unable to cover surfaces of more than a limited size, for the growing epithelial edge, lacking the hypothetical chemotaxic influence of another epithelial surface reasonably near it, only extends over the granulations for a limited distance. Islands of residual deep skin, and skin grafts early applied to healthy granulating surfaces, hasten repair and diminish the extent of contractures.

The Clinical Manifestations are such as have already been outlined. The initial shock is followed by a period of toxicity which begins perhaps, 12 to 24 hours after the injury and, if not fatal during the few days following, may altogether be recovered from or may merge into a state of sepsis. As will presently appear, both the toxic state and the septic condition can often be forestalled by treatment. Among children and adults alike, toxemia is marked by restlessness or drowsiness, by an elevated temperature and a rapid pulse. Delirium is not unusual, and in infants and children convulsions, especially in the case of severe burns. After the first days of the illness, pain is not a notable feature, unless the condition is so treated that frequent dressings of raw surfaces must be made. During the height of the chemical toxemia, the blood may undergo a remarkable concentration-the hemoglobin index reading over 100 per cent. The non-protein nitrogen may be increased; the urinary output, diminished.

The burned tissues at first appear dry-deeply flushed and blistered in instances of second degree burns, and ivory-like or black in the case of third degree burns. A combination of the two states is, of course, the rule. If exposed to dry air, the burns of second degree, after blistering, become covered with an exudate and so encrusted. Swelling of the burned part is always to be expected and may be enormous, exudation is violent and secondary infection destructive. Under favorable circumstances, however, healing takes place, though the new-grown skin is likely to be vascular and easily injured. Tissues burned to the third degree, black and dry at first, are slowly cast off, leaving a grey, unhealthy surface, which, under favorable conditions (minimization of infection), is gradually replaced by bright granulations. If bits of the deep layer of the epidermis have been preserved here and there, even large areas are covered by epithelium with a fair degree of rapidity. Lacking this aid, ulcers of large size are often left to be covered by artificial aids (skin grafts), and late contractions are common and disfiguring.





170A

~~17A~~

170A

176A

Treatment of the dangerous types of burn presents the greatest difficulty. The problems are, however, clean cut: to keep the patient alive in the period of shock and toxemia, and to forward the healing of the burned surface with the least possible delay, sepsis and subsequent contraction of scar. This is a matter for hospital care, and the more quickly the patient can reach a hospital, the better his chances. However, the success of treatment is considerably influenced by the nature of the emergency measures which are first taken. When the extent and apparent nature of the burn are such that shock is to be expected, and the technical means of applying the proper local treatment are not at hand, the patient should be placed in a comfortable position in war, surroundings. If pain is severe, morphia should be given. The burned area, covered by clothing should not be exposed nor treated by oils, greases, soda or other remedies, but should be protected from new and unclean contacts.

If and when adequate means of further treatment are available the patient should be placed, between blankets, in a room whose temperature is kept between 80 to 90 degrees F. Fluids should be given by mouth, rectum and subcutaneous tissues up to 8 liters daily. In dressing the burns, the infliction of pain should be guarded by removing any burned covering, piecemeal, and covering the exposed areas with gauze saturated in 2.5 per cent tannic acid solution. Or the tannic acid may repeatedly be sprayed or painted on without the interposition of gauze. The plan of treatment is in fact, to tan the skin. In second degree burns, the application is kept up at regular intervals for 8, 10, 12, or even 24 hours, that is, until the skin takes on a yellowish-brown color and gives a parchment like feeling to the touch. Too prolonged application and deep penetration would kill such portions of the dermis as are yet alive, blackened areas are tanned by estimation, but the depth of the tanning is in that case less important since the skin and subcutaneous tissues are already destroyed.

The advantages of this treatment are that it relieves pain, usually within one-half hour, that at the same time it diminishes shock, that it is relatively easy of application, requiring no elaborate dressings, that it lessens greatly the formation and absorption of the toxic products of the burn, and that it diminishes the chances of infection. If necessary, tanning is repeated. Meanwhile, the burned area is kept exposed to the air under a cradle, for no absorbent or protective dressings are required. The care of the patient, as compared with that by other methods, is under this system, comparatively simple. The new skin grows under the crust, exudation ceases and finally the tanned covering is cast off, leaving a reasonably healthy surface. Even third degree burns are far less intractable than usual.



temperature of 1800 F., supplying abundant fluids, combatting pain by sterile moist applications of dilute novocaine solution, and, at the moment that the initial period of shock is passed, actually excising the areas burned to the third degree under a general anaesthetic. This method is reported to have given excellent results and has the support of experimental work. In one form or another, such operative treatment of burns has definite advantages over other methods. It is credibly reported to have forestalled the development of secondary toxemia and sepsis. Yet it can hardly be held that the administration of a general anaesthetic, in addition to the operative trauma is as safe as the treatment by tanning. The matter is unsettled. Probably operative excision has a field of usefulness in the smaller severe burns, especially those caused by electricity.

1705





~~121~~ 171A

For burns of the first degree, no such complicated treatment is required. Relief of pain is obtained by paraffin or vaseline gauze coverings. But sterile dressings of some sort are decidedly necessary.

The treatment of the late contractions which have resulted from extensive deep burns belongs in the province of that surgeon with the rare gift of ingenuity in plastic work. The transplantation of living skin or pedicled skin grafts is a difficult art.

Y.B. of G.S. P. 69

The aseptic tannic acid treatment of diffuse superficial burns used at Hartford hospital is described by D.B. Wells: Instead of putting an extensively burned patient into a tent heated by electric lights and spraying with warm tannic acid, I place him immediately in a tub filled with warm tannic acid solution. A good big tub is desirable, such as is seen in the hydrotherapeutic department. I am not particular about the precise percentage of the solution but use enough tannic acid powder to give it a good muddy color. Tannic acid is cheap and a large quantity is kept on hand and immediately available in the emergency room. Fresh water is run in and the solution drained out continuously a comfortable temperature being always maintained; and more powder added from time to time. I have not seen a case of poisoning. Every adult has experienced such relief as to be thoroughly cooperative within a few minutes after being placed in the tub; hysterical children in the hands of a tactful nurse and under the influence of a mild narcotic, become quiet within a few minutes.

Once the analgesic effect has become manifest, the real work begins. The solution softens and elevates the destroyed tissue. Gross tags of full thickness skin are painlessly removed with thumb forceps and scissors; the tops of blisters are carefully wiped away with gauze. Unburned areas right up to the margin of the scar are gently but scrupulously scrubbed with soap and water as though patient were receiving a bed bath. When the butt becomes grossly fouled it is drained, quickly cleaned and immediately refilled with a fresh solution. This goes on as long as possible a continuous painstaking, back-breaking effort to remove completely every bit of dead tissue and cleanse thoroughly the whole body. It is not work for a nurse in a starched uniform, and intern who knows only how to write orders or a surgeon in evening clothes. My objective is a full 3 hours of continuous mechanical cleansing with the patient largely immersed in a tub full of solution: after such a conscientious effort has been made, not only the burned area but the whole body surface is mechanically clean, while pathogenic bacteria with their necrotic pabulum have been practically eliminated. By the time the patient is ready to leave the tub, the tan is already established. It is an unusually smooth, thin, adherent coaculum, for all foreign material, sloughs, and blisters have been removed in tub and the chemical penetrative powers of the acid have not been dissipated in the fixation of such dead tissue as could and should be removed mechanically.



patient is transferred to a work room, placed on a dry bed and, from this time on, kept absolutely dry with a continuous draft of warm air from one or more large commercial hair driers. These machines are so constructed as to permit a wide range of choice in the velocity and temperature of the draft. A tent heated by electric lights cannot compare with the blower for either comfort of the patient or for efficiency. The burned area and preferably the entire body is fully exposed to the warm draft. For about 72 hours after removal from tub, the burned areas are more or less constantly sprayed with a 5% solution of tannic acid but immediately and thoroughly dried with the blower. Only a small area is sprayed at a time; this is completely and absolutely dried before another area is sprayed.

171 B





172

The bed is never allowed to even become damp. I am very careful that every little blister that may form during this period is carefully wiped away with sterile gauze, sprayed and immediately dried. Such little blisters represent inflammatory products from cells which, though they may have survived the immediate trauma, were so grievously injured that they died after removal from the tub. They almost invariably appear at the periphery of the developing eschar.

The eschar is usually perfectly firm and adherent after 72 hours of alternate spraying and immediate thorough drying. Thereafter new blisters seldom appear. From this time on the blower alone is employed but the draft of warm air must be maintained, the completely exposed patient must be kept absolutely dry. Even a little perspiration may soften the precipitate, and a macerated tan invites bacterial invasion. With infection, the eschar will gradually separate and be replaced by a granuloma which probably will require grafting under rather unfavorable conditions.

Y.B. of C.S. p.68

A.G. Bettman, takes up the treatment:

Scarlet R ointment alone has been used for a long period. However, the results are not completely satisfactory, for while the growth of epithelium is stimulated, infection acts as a deterrent. By the addition of chinisol, a powerful antiseptic, the infection is held in check while growth of epithelium is promoted. The addition of chlorotone makes the dressing soothing and patients who have suffered considerable pain become comfortable in a few minutes after this dressing.

Oxyquinoline sulphate (Chinisol)	Grss. x
Trichlortertiarybutyl alcohol (Chlorotone)	Grss. xl
Scarlet R. ointment 5%	Oz. lv
Liquid petrolatum	Dr. 1

The Chinisol and chlorotone are separately mixed with portions of the petrolatum. These are then added to the Scarlet R ointment until a smooth ointment results. This is next heated in a water bath and rolled gauze bandages are immersed until thoroughly impregnated. The warp and wool absorb the ointment but the interstices are open. In the treatment of a burn or other wound with this gauze a single layer is laid over the wound, dry dressings over it and held with a bandage so the medicated gauze is in intimate contact with the entire surface. Secretions seep up through the mesh and are carried away by the gauze. The superficial dressings are changed every second or third day and the red gauze as may be necessary. When the gauze adheres to the wound it is never pulled off. Where it is floated up by secretion or is not adherent, the result of complete healing, it is removed and new gauze is reapplied to all unhealed areas as before.





DEFINITIONS

A wound (injury, trauma) is a solution of continuity of the tissues of the body due to mechanical violence (traumatism). The term usually is restricted to open lisions of the soft tissues.

1. Closed wounds (contusions, bruises) are those without a surface opening or division of the skin.  
 11. Open wounds have an opening through the skin or mucous membrane and include.

1. Incised, having sharp, clean-cut edges.
2. Lacerated and contused, produced by a blunt instrument with tearing and bruising, including crushing, pulpifying wounds, and most traumatic amputations and avulsions.
3. Punctured, deep and narrow, due to small pointed instruments, and including stab wounds.
4. Gunshot due to the action of firearms.

Penetrating wounds invade important cavities, such as the abdomen, thorax, arachnoid, or a joint, the cavity of the heart, larynx, or trachea.

Perforating wounds are those passing through a part, having a wound of entrance and one of exit, as of the head, neck, thorax, abdomen or extremity.

111. Aseptic wound: One free from infection or active pathogenic micro-organisms.

14. Septic wound: One infected by pathogenic organisms.

v. Dissection wound: An infected wound acquired in dissection.

vi. Poisoned wound: One in which venom or other poison has been introduced, including stings and snake bites.

vii. Simple wounds: are those without serious associated injury.

viii. Complicated wounds: are those associated with serious local injury, such as a fracture, dislocation, opening of a joint or large cavity of the body, rupture of a large artery, or division of an important nerve.

ix. Brush burn: is a superficial wound in which there is an association of mechanical violence and heat, as produced by contact with rapid movement.

WOUND HEALING

1. First intention: The tissues being accurately approximated union occurs without gap, loss of tissue, or the formation of granulations, and results in the formation of a linear scar.

2. Second intention: A gap exists which is first filled by granulations. These organize and contract with the formation of connective tissue. The surface is covered by epithelium usually forming a wide and disfiguring scar.

3. Third intention: The surfaces of a granulating wound having been brought together, healing occurs by union of the apposed granulating surfaces.

4. Healing Under a Scab: The surface defect is covered by a mass of adherent dried blood or wound exudation, under which repair takes place.

5. Healing by Organization of Blood Clot: The clot is invaded





174

by formative cells, removed by the leukocytes and replaced by granulation tissue. The blood clot serves as a scaffolding for forming connective tissue.

6. Healing of a detached portion of the body. Rose and Car. 256 Healing of a detached portion of the body., is not infrequently seen when parts of the nose, external ear, or finger tip are separated. The loose portion is carefully cleaned, re-applied accurately, and fixed firmly, though gently into position. If it lives, union occurs by first intention; if it dies, but remains aseptic, it constitutes a cover or scab, under which healing by granulation occurs.

#### WOUND HEALING

At Columbia University, E.L. Whowes has investigated the strength of wounds sutured with catgut and silk: Experimental wounds in the stomachs of rats sutured with catgut and silk of the same and different sizes demonstrated that in all repaired with silk fibro-plasia began earlier and wound accumulated strength more rapidly than in those sutured with catgut. Microscopic sections showed the exudative phase to be of less duration in the wounds of silk than with catgut. The experiments showed the larger sizes of immediately after suturing or during healing Silk must be employed by a definite technique. Catgut would have greater efficiency, if used according to the same technique.

#### THE RESISTANCE OF HEALING WOUNDS TO INFECTION

Hovos, Sooy and Harvey studied the rate of healing of clean incised, sutured wounds in dogs by mensuration of the tensile strength of these wounds at definite intervals. They concluded that there exists a quiescent phase or lag period, of from 3 to 5 days, characterized by fibrin formation in the blood or plasma exuded between the surfaces of the fresh wound. During this interval, the approximation of the incised tissue is dependent upon the mechanical coaptation of its sutures. From the sixth day on, however, the period of fibroplasia, manifest by multiplying fibroblasts and sprouting blood vessels the wound rapidly develops intrinsic holding power until, from the tenth to the fourteenth day, its tensile strength reaches a maximum comparable to that of unincised tissue.

After an incision of tissue, there follows a well defined period of about 6 hours in length which that tissues resistance to invasion by bacteria is at a minimum. In this period bacteria not only flourish and cause suppuration in the local lesion, but evade without apparent restraint, the enveloping tissues setting up extensive rapidly spreading infection, which in a number of instances result in the death of the animal. When organisms are implanted upon a sutured wound 12 hours after operation although the great majority of incisions become infected the infections are localized. No systemic infections develop which overwhelm the animal, and no extensive spreading suppuration occurs. From this time on, the percentage and severity of infections steadily decreases until, between the fourth and fifth postoperative days it is no longer possible to cause infection by implantation of virulent organisms on the surface of the wound.





Summary:

1. The resistance of a healing wound to infection is minimal during the first 6 hours.
2. After the first 6 hours, infections decrease in number and severity until fifth day.
3. On the fifth day after operation, the resistance of a wound to infection has reached a level comparable to that of intact tissue.
4. Removal of stitches on the sixth day after operation does not lower the resistance of the wound to infection.
5. The period of infection corresponds to the "lag period" of healing wounds.

Healing is prevented or delayed by:

1. Imperfect hemostasis.
2. Foreign bodies.
3. Sepsis.
4. Imperfect apposition as from the stitches being improperly inserted, too tense, too easily absorbed, or too quickly removed.
5. Wound tension.
6. Insufficient drainage.
7. Lack of rest.
8. Constitutional disease, such as tuberculosis, syphilis or arteriosclerosis.

SLOUGHING IS INFLUENCED BY:

1. The severity of the trauma.
  2. The vascularity and vitality of the tissue. A force that devitalized the tissues of the hands, feet or extremities, and is followed by extensive sloughing, may cause no gross necrosis upon the scalp or face. The vulnerability of tissues to contusion and laceration progressively increases from the scalp, face, neck, trunk, lower arm, leg, and hand to the foot.
  3. Infection. Devitalized tissues are especially susceptible to infection, necrosis, and gas gangrene. It is to be recalled that offensive, decomposing material, and even night soil in wounds may be free from pathogenic bacteria and cause no infection.
  4. Age and dyscrasia of the patient. Senility, obesity, arteriosclerosis, syphilis or other disease may delay the healing of the wound.
  5. Treatment used including:
    - a. Constriction occurring during the secondary swelling, from the unwise introduction of sutures, failure to divide the restraining overlying skin, or from the pressure of badly applied dressings.
    - b. Insufficient drainage.
    - c. Traumatizing manipulation.
    - d. Strong antiseptics.
    - e. Failure to maintain the normal temperature of the part.
    - f. Lack of local and general rest.
    - g. Presence of foreign bodies.
- Wounds from contact with garden or other soil may contain the spores of tetanus. Wounds, contaminated by shotgun





wads woolen clothing, or fecal material are subject to gas gangrene.

### SECONDARY HEMORRHAGE

Secondary hemorrhage. Under this title are included all forms of hemorrhage from wounds which occur after the lapse of 24 hours. It is almost always due to infection, and was formerly very common, often leading to a fatal termination; since the introduction of antiseptic surgery it is but seldom seen, except where asepsis cannot be fully maintained, as in the mouth, pharynx, etc., or in the treatment of gunshot wounds.

### AIR-BORNE BACTERIA:

Dr. Hunt exhibited a culture made during a laparotomy requiring an hours time. It was thickly sprinkled with colonies of staphlo-cocci and one of hemolytic streptococcus.

In 28 routine operations, he and two colleagues made the observations as follows: The length of incision and time of operation were noted. After the peritoneum was closed 10cc of sterile salt solution was squirted into the wound to wash over the cut surfaces and was then sucked back into the syringe, put into a sterile test tube and sent to laboratory. The cultures were negative in but three instances; in one gastroenterostomy with sides of wound protected by sewn-in towels, and in one appendectomy there were only 10 colonies; in the other 25 the counts ranged from 50 to 1,680 with four "too numerous to count." All wounds were washed out with neutral acriflavine just before completing the sewing so the regulation of the healing to the bacterial count cannot be deducted. Eighteen healed by first intention without any discharge at all, nine slight and one moderate discharge. One hernio-rrhaphy having a count of 1,680 and a slight discharge developed mild femoral thrombophlebitis. No fatalities in hospital. Note: The danger of serious wound infection from the nose and throat of a surgeon, or an assistant who is developing an ordinary sore throat or cold, is so great that under no circumstances should any person with an acute cold be permitted in the operative room during an operation.

### TREATMENT:

Asepsis may be defined as the protection of wounds, purposefully or accidentally made, against invasion by bacteria. Surgical sterilization aims at the removal or destruction of living bacteria without injury to the tissues. Three methods are available for this purpose: 1. Mechanical cleansing. 2. The use of heat. 3. The use of chemicals. Not all are universally applicable. Preparation for an operation invariably invokes all three.

### TREATMENT OF INCISED WOUNDS.

Seven essentials must be attended to if healing by first intention is to be obtained, viz:





1. Arrest of all bleeding.
2. Sterilization of the wound and its surroundings.
3. The coaptation of the opposed surfaces by means of sutures.
4. Drainage, if necessary, must be provided.
5. All fresh sources of irritation and infection of the wound must be excluded by some form of antiseptic or aseptic dressing.
6. Rest to the injured part must be secured by such an arrangement of splints, slings, or bandages as may be necessary.
7. The general health of the patient is a most important item.

#### CLOSURE OF ASEPTIC WOUNDS

HOTAN'S p. 44

The closure of wounds, whether made in entering the abdomen, repairing a hernia or removing a tumor, is carried out with an equally scrupulous regard for the integrity of the tissue. The anatomic layers having the greatest strength in repair are stitched together. The small amount of tissue consistent with the disruptive pressure which a wound must sustain is included in the stitches. The least possible space is left between approximated surfaces. In abdominal wounds, the peritoneum, which heals most rapidly, is united by an absorbable suture. Fascial layers are joined by whatever material and in whatever way the operator prefers, and loosely tied stitches are often used to include even muscle, when the object is to close dead space rather than attach adjacent surfaces.

It has been found experimentally that, given favorable conditions, wounds acquire practically their full tensile strength against a briefly applied disruptive force in from 10-14 days (Harvey). The choice of suture material is therefore dictated by the security of closure which is needed during this period. As a rule, if the tension which the stitches must bear—such as is caused, for instance, by coughing or vomiting after an abdominal operation, is worn out stitches tied outside the skin is preferred to heavy in-absorbable stitches of silk buried within the body. But where fine light material is quite safe, silk is most satisfactory. Haemostasis should be absolute, but if for any reason a post-operative collection of blood or serum within a wound is feared, a thin drain of gutta percha tissue is led into it.

Closure of the skin should be made with great care, if only for the patient's comfort. When the scar will always be evident, the most perfect approximation by the finest stitches is demanded. For cutaneous stitches such materials as fine silk-worm cut, horse-hair, or silk are generally used. In children who may resent the removal of stitches a buried sub-cutaneous suture of catgut is satisfactory. There are excellent mechanical devices in the form of clips for holding cutaneous edges together.

#### TREATMENT

Tabcock, page 32-39

(1) Reaction from shock and arrest of hemorrhage. Amputation, anesthetization, or extensive wound manipulation during the period of intense shock is frequently fatal and should be avoided, except when a persistent shock is due to gas gangrene. Hemorrhage should be arrested if possible, in the wound by forcipressure, packing or, if the patient's condition is very serious, by the temporary guarded application of a





178

tourniquet, and a moist antiseptic dressing and an immobilizing support applied. As soon as the patient is out of intense shock, the wound should be sterilized and asepticated, preferably under nitrous-oxide or ethylene-oxygen anesthesia. The surrounding skin is cleansed by turpentine or ether, followed by alcohol and tincture of iodine. Ether followed by half-strength tincture of iodine, is poured over the wound surface and foreign bodies removed and debridement, or the excision of tissue, devitalized or infiltrated with dirt excised by sharp dissection is carried out. Serious cavities should immediately be closed.

(2) Prophylactic injection of anti-tetanic serum.

(3) Wound suture in selected cases only.

(4) Amputation.

A. Primary or immediate closure, after careful mechanical and chemical sterilization, is indicated during the first twelve hours, for all incised wounds, and for most lacerated and contused wounds of the scalp, face and trunk. Even wounds impregnated with air, and gunshot wounds may often be closed after early thorough debridement. For the extremities delayed closure of the skin to avoid strain-line tension is desirable for severely contused wounds.

B. Delayed primary closure is used: A. If the patient is in serious shock; B. If delay is desirable to determine the viability of the tissues, and to avoid primary tension or constriction; C. If there is continued oozing that can best be controlled by packing; D. To determine the degree of wound infection.

C. Secondary closure, or closure after sloughing has ceased and granulation started, is advisable: A. Where the vitality of the tissues is greatly impaired; B. Where gas gangrene or other serious infection, best handled with an open wound, is feared; C. Where the constitutional condition through diabetes, arteriosclerosis, active syphilis, or other causes interferes with normal healing.

Secondary infection and suppuration should be treated by:

1. Free opening of the wound for the escape of inflammatory products and to relieve tension and constriction. (with streptococci edema, incisions and rarely desirable).
2. Complete rest, general and local.
3. Moist fomentations or irrigations.
4. Support without constriction.
5. Amputation as a last resort.

THE STERILIZATION OF FRESHLY MADE WOUNDS.

Homan's p. 47.

Cuts and stabs are prepared for sterilization by cleansing the skin about them. The hair is shaved if necessary. Soap and water scrubbing may have to be preceded by washing with ether or gasoline (neither of which harms the tissues) if the skin is very greasy. If the whole extent of the wound is accessible without enlargement, and contains no foreign body, such as a fragment of glass, it should merely be irrigated with a non-irritating fluid such as bichloride of mercury in strength of 1 to 3000. The irrigation should be





generous, the cut held wide open, and fully 5 minutes spent in thoroughly washing out every corner. The excess of bichloride should finally be washed out with satl solution or sterile water. In this way the wound is partly chemically, partly mechanically, cleansed. Wiping the surrounding skin with alcohol or iodine makes it ready for closure. Most sma ll wounds are closed without drainage. Larger or more complicated ones are usually drained with a skip of folded gutta percha tissue.

In case the wound is deep and narrow, that is, if it is truly a stab or puncture, enlargement of the external opening must usually be a preliminary step. Only a special knowledge of the nature of the instrument with which the wound was made, and of the condition of the patients skin, would warrant the omission to widen and explore the opening. This being done, the treatment will be that of the simple incision, but it should be borne in mind that infectious material is more apt to be carried into deep stab wounds than into sweeping cuts however extensive. More especially are the anaerobic bacteria, which may become implanted in the depths of a wound, to be feared.

The treatment which has been described is simple, and unless enlargement of the wound has been made, may be almost painless. If enlargement and suture are demanded, the injection beneath the skin of 1% novocain solution is all that is required. Should alcohol or iodine be applied to an open wound, the pain, though only moment ru, is considerable. These antiseptica are called for only in the more rough and ready treatment of wounds when a painstaking irrigation can not be carried out.

Lacerated and contused wounds result from street and railroad accidents, and those due to the use of tools and machinery, from explosives in civil life, and in war, from missiles, particularly shells. Here a great part of the sterilization is mechanical the removal by open dissection of foreign material and of all tissue so treatment became known in the war of 1914 as debridement. It is demanded especially in the case of lacerated injuries of muscle and fascia, and of compound fracture of the bone. By sharp dissection all tissues which being dead, offer a fertile soil for the growth of bacteria, particularly the anaerobic bacilli of tetanus and gas gangrene are removed. Such a wound is thus converted, though often in a rather complicated form into something very like a clean incision and may be subjected to the same irrigation by antiseptic fluids. It may even be closed, by experienced operators without drainage though a reasonable conservatism ordinarily dictates incomplete closure and the insertion of a skip of gutta percha tissue or even wide open packing with vaseline gauze.





## INFECTED WOUNDS

B. of A. C. of S., July 1927.

If a wound becomes infected a culture should be made as soon as possible as signs of infection appear. With a simple stitch abscess the removal of one or two sutures and the application of hot moist dressing for a few days will usually suffice.

## METHODS OF APPLYING HEAT AND COLD

Homan's P. 53

Hot soaks, and especially antiseptic soaks, represent immersion in a hot fluid of some part of the body the fingers hands feet which are the seat of suppurative inflammation. Their use in surgery has probably been overdone to this extent that they are too often expected to accomplish something which is more properly the function of other surgical measures. As a means of applying heat they are subject to about the same limitations as poultices but when used after the incision of suppurative lesions they may be the means of carrying antiseptics into the wound. They soften gauze coverings hardened by drying exudates and adherent to sensitive surfaces making dressings less painful, but if overdone they so macerate the skin as to disguise redness, pallor wrinkling and other signs which mark the course of the disease.

Hot fomentations are cloths or towels wring out in a very hot solution and applied directly to the desired part. They are used much like poultices but with the added advantages of conveying an antiseptic to the part in the treatment of local sepsis and again like poultices they have an analgesic and restful effect upon painful and stiff joints. In this way they cause relaxation of muscles defensively stiffened and so permit freer motion.

Hot dressings are applied for the purpose of increasing the hyperemia which is nature's first reaction to infection and helping to localize the infectious process. If they are to be effective they must be kept hot. To change the dressings as soon as they have lost their initial heat causes a great deal of work, a tremendous expenditure for dressings, and much discomfort and possibly suffering for the patient. The use of an electric light suspended immediately over the dressing is the most satisfactory method of retaining heat. Hot water bottles outside the dressing form a satisfactory substitute time in sufficient quantity to keep it moist. If the dressing cannot be maintained at a constant temperature it is better to dispense entirely with the wet dressing; for the chilling of the part which results from the presence of a cold wet dressing causes retardation of the blood stream and lowered vitality of the part. Hot dressings should not be continued indefinitely. If maintained too long the affected part becomes edematous, the skin becomes softened and macerated, and the infectious process drags on for an interminable period. Usually after from four to six days, soaking of the affected part in a bath of hot sterile solution for 10 to 15 minutes, twice daily can be substituted for the continuous hot wet dressing. After being soaked the affected part should be thoroughly dried in the sunlight or under an electric light and a dry dressing applied which is only thick enough to absorb the wound secretion.





GLYCERINE DRESSING-for 30 years D. Kyle has been able to reap the combined advantages of a wet and a dry dressing by the use of glycerine, with out being troubled with any of the disadvantages of either. The addition of about 25% of glycerine to a wet dressing avoids bleaching and maceration of skin. The surface of the wound or sore is kept moist, and discharge is not pent up under a scab, and the wound is once more able to heal from the bottom. Even where this dressing has to be applied constantly for weeks or even months it is surprising how normal the skin remains under the dressing and in most cases no one would suspect a wet dressing had been in use. That is all the more remarkable in as much as the dressing is covered by gutta serena tissue.

ANTISEPTICS-J.A. Manzella discusses the value of antiseptics in wound treatment. Modern technic is directed to the exclusion of micro-organisms from the wound whether clean or dirty, while at the same time it aims at putting the tissues in the best possible position for exercising those bactericidal powers which they normally possess. To accomplish this essential surgical principles are to be closely followed out strict asepsis, control of hemorrhage, careful cleaning, and mechanical removal of foreign material, careful debridement of dead or devitalized tissues, drainage, coaptation of tissues, rest, etc. Then to this we add proper chemical cleansing or sterilization without damage to tissues, we will have obtained the greatest value that can be secured from such antiseptics. Obviously no antiseptic will penetrate masses of necrotic tissues. To use one in a wound and then leave foreign bodies and debris behind, or allow more contamination to take place, makes it all valueless. All here we have a fundamental reason for the discrepancy in results, observations and conclusions arrived at.

Manzella is of the opinion that a few antiseptics have a definite value in the treatment of wounds. Their principal and greatest value is exhibited where prophylactic use for the prevention of infection is the principal object as particularly demonstrated in the class of contaminated accidental or traumatic wounds. That the value of antiseptics in wounds where active established infection is present is definitely small the use of Dakin's solution according to the Carrel Dakin technic being of some definite antiseptic value. However, in this group the antiseptic solutions themselves in irrigations or wet dressings are apparently of more benefit by aiding drainage, whether mechanically or by osmotic action rather than by the antiseptic action itself. That antiseptics may be used with advantage on wounds where established infection is present without active inflammatory phenomena such as chronic granulations and ulcers. Further, that the application of antiseptics is of some value in subsequent dressing for the prevention of secondary infection or recontamination, in all classes of wounds. That of the large host of antiseptics, most are of little value, not meeting with the requirement that they shall possess effective bactericidal action without harm to tissues. That antiseptics of value in wound surgery can be limited to a few, among which may be mentioned tincture of green soap, tincture of iodine, dichloramine mercurochrome, metachen and acriflavine.





STERILIZATION OF SUPPURATING WOUNDS

The researches of Carrel and Dakin have shown that Dakin's fluid is not only a remarkably effective bactericide but possesses certain valuable properties lacking in other antiseptic fluids. More especially, it does not coagulate albumen but actually dissolves blood clot fibrin masses and necrotic tissue. Thus it is able to penetrate into every corner of even a complicated wound and attack bacteria directly. It is harmless to subcutaneous living tissue though somewhat irritating to the skin and utterly destructive to fresh peritoneal surfaces. Its defects lie in the care required for its making. Its instability when made and the very brief period during which it retains its antiseptic properties when brought in contact with tissues. Naturally then to be effective, it must be injected or sprayed into a wound at frequent intervals, and fresh solutions must frequently be prepared. Since it is decomposed by light and heat, especially sunlight, it must be kept, if even for no more than a few days in amber colored bottles.

The wounds which are particularly adapted to sterilization by Dakin's fluid are those in which dependent drainage is difficult to establish and in which the surfaces are irregular inaccessible or so scarred that the patients circulating fluids penetrate them with difficulty. The solution is introduced at regular intervals through fenestrated rubber tubes in such a way that the fluid reaches all parts of the wound at each injection. The cutaneous edges are kept scrupulously clean and are protected from any leakage of the solution by a layer of gauze impregnated with vaseline. Large water proof pads are bandaged about the field of treatment.



## THE CARRELL-DAKIN TECHNIQUE

Barne's Hospital Notes

- A. Purpose
1. To make, by repeated injections, infected wounds sterile.
- B. Requisites
1. Fresh stock solution, kept in ice box.
  2. Solution in jar with patient's name on lid.
  3. Urthral irrigating syringe.
  4. Dakin's tubes #5, #10, #20.
  5. Sterile vaseline gauze.
- C. Procedure
1. Using fresh syringe each time, the amount of Dakin's solution ordered is instilled in each tube.
- D. Precautions
1. The solution must be injected on time and no treatments missed.
  2. The wound will clear up according to accuracy in treatments.
  3. See that no solution gets out on the skin.
  4. See that the solution is fresh. Homan's p. 49.

Two other chlorine antiseptics, chloramine-T and dichloramine-T have also been devised by Dakin. Dissolved in an oily medium, the latter may be sprayed upon raw surfaces or poured into inaccessible parts of deep wounds. Both are suitable for prolonged use or for first dressings of recent wounds when irrigation is for any reason inadvisable. Of the two, dichloramine-T is more generally suitable for wounds containing much necrotic material, since the antiseptic which it liberates has a solvent action upon this material. It is made into an 8% solution in chloroocane, and if protected from light, heat, and moisture, will then remain effective for a month. Chloramine-T is used as a watery solution in a strength as high as 2%. It is more stable than Dakin's fluid.

## MAGGOTS

Y.B. of G.S. p.75.

The role of maggots in disinfection of wounds has been investigated at Church Home (Baltimore) by Robinson and Norwood: They find maggots in infected wounds are able to hasten disinfection.





They ingest bacteria in large numbers in feeding upon the necrotic tissues. Cultures of aseptic dissection of the alimentary tract showed an abundance of bacteria in the fore-stomach, decreasing numbers in the hind-stomach, and apparently a total disappearance in the intestine. This indicates that bacteria are destroyed in passing through the alimentary canal. To determine whether or not destruction is caused by digestion, tests were made of the action of digestive enzymes of maggots upon *S. hemolyticus* and *S. aureus*. The enzymes were obtained by maceration of sterile maggot tissue. Results were negative in all cases. This is probably due to death of enzyme secreting cells during maceration. Livingston and Prince report positive results and state that applications of maggot extract were effective as a curative agent. The data however, do not make clear how the healing effect obtained was due to maggot extract. Repetition confirm authors' negative results. Maggots feed upon the necrotic and purulent materials within the wound. They thus aid in cleaning up the wound and making its condition less suitable for bacterial growth. Drainage is stimulated under maggot treatment. The excessive discharge, which is heavily contaminated with bacteria assists in wound disinfection. This investigation indicates that the effects obtained in infected wounds were due to the action of living maggots in the wound.

Homan's p. 46

Deep infected wounds and wounds left open because infection is feared are best drained by gutta serena tissue. The tissue may be folded into a long flat wick or may be wrapped about gauze so as to make the cigarette like tube so much used in abdominal surgery and called a "cigarette wick". The smooth tissue prevents adhesion of the gauze



to depths of the wounds, and the gauze which fills the cigarette at first absorbs the secretions at the bottom of the wound. For a time it offers capillary drainage but soon becomes soaked and plugged with secretion. Gutta serena tissue without gauze filling is the drain par excellence for structures readily injured by pressure, such as tendon sheaths. If there is any danger that a wick may become lost in a wound, a large safety pin should be attached to its exposed end.

Rubber tubing is widely used for drainage purposes. Its advantages are that it offers a permanent passage for the escape of the products of infection. It can frequently be removed and boiled. It can, if necessary, be made to conduct the discharge from the wound away from the patient, into a bottle for instance. Thus it is available and generally used for draining the bile passages, the urinary bladder and the infected thorax. Its only real disadvantage lies in the fact that it is relatively hard. Therefore, if used to drain intraabdominal septic processes it may cause pressure-necrosis of intestine, a blood vessel, or any organ with which it lies in contact. This disadvantage is minimized by the selection of new soft tubing and by skill in placing the drain. A split half of a tube is more flexible and indeed a most satisfactory drain for any deep, narrow, septic wound.

Babcock p. 42.

#### WOUNDS OF JOINTS are treated by:

1. Complete closure.
  2. Closure of the capsule with drainage of the superficial tissues.
- Drains should not be introduced into joints as a primary procedure.

#### TETANUS

Dr. Mims Gage.

1. Present day mortality (40-80%). Equals pre-antitoxin era (41-84) due to disregard of trivial wounds by laity and medical profession.







11. INCIDENCE

- A. Charity Hospital series: .14% in 980,245 cases admitted. Males predominating.
- B. In industry: 0.0008% in 1,237,500 injuries (Wainwright).
- C. In war: 0.117% in 2,032,142 wounded soldiers (Bruce).

111. ETIOLOGY

A. Specific micro-organism.

1. Tetanus bacillus

a. Characteristics.

(1) Intestinal tract.

- a. Man 34% (Tenbroeck) 5-7% (Browning)
- b. Animals

(2) Soil.

B. Contributing factors

- 1. Anacrobiosis.
- 2. Devitalization.
- 3. Foreign body.
- 4. Pyogenic infection.

IV. PATHOGENESIS

A. Tetanus bacillus confined to wound.

B. Toxin

1. Absorption

a. by lymph and blood

b. increased by muscle spasm and convulsion

2. Transportation

a. -neuro-muscular end plate.

(1) blood

b. central nervous system

(1) motor nerves

3. Fixation

a. Anterior horn cells



(1) swelling and disintegration

(2) Diminished threshold to all stimuli

#### V. Symptomatology

##### A. Incubation period

1. Presence of vegetative forms and spores.
2. Type of wound,
3. Foreign body
4. Pyogenic infection
5. Immunity of individual tetanus carriers

##### B. Muscle Spasm

1. Trismus
2. Risus sardonicus
3. Opisthotonos
4. Abdominal rigidity
5. Convulsions

##### C. Systemic manifestations

1. Pyrexia
2. Tachycardia
3. Fluid Imbalance
4. Retention of urine and feces
5. Rapid exhaustion and emaciation

#### VI Prognosis: Depends upon

##### A. Incubation period

- |            |      |        |
|------------|------|--------|
| 1-10 days  | -84% |        |
| 14-21 days | -25% | Calvin |
| 2-11 days  | -71% |        |
| 11-22 days | -47% |        |
| 22-45 days | -42% | Graves |





188  
B. Number and frequency of convulsions

C. Prophylactic antitetanic serum

D. Early and adequate treatment

## VII Treatment

### A. Prophylaxis

1. Debride all wounds

2. Antitetanic serum, dose depending upon wound

3. Prevent and control infection.

4. Maintain aerobiosis

### B. Active

#### 1. Local

a. Remove foreign bodies and devitalized tissue, no local analgesis

b. Do not cauterize.

c. Control infection

#### 2. Systemic

##### a. Antitoxin

1. Massive doses antitetanic serum first 24 hours

Dose depends upon severity and duration

a. Intravenous

b. Intramuscular

2. daily injection of antitetanic serum to maintain high titer.

a. intramuscular

##### b. Sedation

1. barbiturates

2. avertin

3. Morphine

### C. Water Balance

#### 1. Infusion



C. Duodenal intubation

D. Nutrition

1. Duodenal intubation, high caloric diet

2. Blood transfusion

E. General hygienic care

THE ANAEROBIC GAS BACILLI

Homans p. 32

Strictly speaking, these organisms of which the bacillus Welchii is the familiar type are not pyogenic in the accepted sense. Yet they are common and dangerous inhabitants of the soil and with the bacillus of tetanus may contaminate any deep contused or punctured wound. Though they thrive only on the absence of oxygen their spores are yet most tenacious of life. In this state they may resist destruction by anything short of steam under pressure. To act upon the body they must be buried away from the air and they flourish in dead or injured organic material particularly when associated with pyogenic bacteria. Their toxins by destroying tissue and especially muscle continually offer them new culture medium upon which they thrive. Gas formation is abundant and of a peculiar putrid fecal odor. The sense of bubbling on pressure or crepitation as it is called is a telltale of their presence.

It should not be forgotten that gas bacilli occasionally inhabit the intestinal tract of man so that very rarely they may be implanted by fecal contamination in an operative field. In that case, a fatality is inevitable. But however the bacteria are introduced any instruments soiled at operation become a very dangerous source of infection to others for as a routine they are merely scrubbed and boiled rather than sterilized by steam. If then even a suspicion is aroused that gas bacilli have been encountered every contaminated instrument utensils or dressing should be exposed for half an hour





to be kept under pressure.

The infection is not to be confused with wound phagedena. The infection usually follows some operation on the bowel. The wounds are crepitant and gas bubbles are elicited and when the wounds are opened up the muscles present a black necrotic appearance and the characteristic foul odor. The infection is limited to the anterior abdominal wall superficial to the peritoneum in most cases. The peritoneum is apparently able to withstand the infection. The normal habitat of the *B. Welchii* is the terminal ileum and the colon. The patient soon gives evidence of prostration and unless the wound is opened promptly goes into profound collapse. The wound should be packed wide open with gauze soaked in mercuriolate. Hydrogen peroxide is also valuable in the treatment of such infected wounds. Whenever necessary the incision should be extended to include all tissue involved. If the infection involves an extremity and is spreading rapidly, high amputation should not be delayed.

#### GAS GANGRENE

In seven years L. Bohler treated 20,000 open traumatic wounds though serum was not used in any but two developed gas gangrene one required amputation and other ended fatally. In the former the anterior tibial artery was ruptured. In the other the popliteal. He points out that when the blood supply is interfered with the serum cannot prevent gas gangrene and amputation is necessary. Cultures often revealed the organisms of gangrene in the wounds though no clinical symptoms followed. If the peripheral pulse cannot be felt and the toes are cold and pale immediate amputation is called for otherwise careful excision of the wounded tissues is to be done. This may take an hour or over, and general narcosis is never used. A fenestrated cast is put on after excision. Neither the bones nor



the soft tissue are sutured and foreign bodies are not left in the wound.

### DIABETES

The cause of death following surgery in the aged diabetic is not primarily due to a disturbed carbohydrate metabolism but rather to the diffuse arteriosclerosis. This may involve all the vessels cerebral, coronary, and renal as well as those of limbs. Only the latter are amenable to surgical treatment. The diffuse vascular inadequacy is still beyond our scope. Death is often due to circulatory severe infections in the treated surgical diabetic, liable to die of his diabetes.

### BACTERIOPHAGE

Further investigation is required to determine whether the substance or principle known as bacteriophage often now spoken of more shortly as phage is a more or less specific nonliving enzyme produced by the bacteria themselves and bringing about their autolysis in suitable culture media as well as in the living body, or is a living ultramicroscopic filterpassing virus which lives upon and causes the degeneration of certain types of bacteria, especially some belonging to the intestinal group such as dysentery and cholera bacilli, B. coli and many of its relatives and also plague bacilli staphylococci etc. The reports of the results of the treatment of infective conditions by means of multiple and very contradictory and it is as yet difficult to estimate their true value, their successful use having so far apparently been prophylactic rather than therapeutic.

Bacteriophage powders-made from bacteria or their cultures especially the pneumococcus staphylococcus streptococcus show more or less specific bacteriolytic properties when dusted into a wound.





VACCINES:-Topovaccination consists in the application of vaccines or gauze or otherwise, directly to infected wounds. Polyvalent vaccine is used where the causal organism is not known. With closed lesions as furunculosis, the vaccines are applied to the skin. A streptococcic vaccine is used in erysipelas. Babcock p. 49

DELAYED HEALING-due to the size of the wound may be overcome by skin grafting or plastic operation. If there is sufficient adjacent tissue for closure without tension the granulation surface is sterilized by the application of a saturated solution of chloride of zinc for 5 minutes excised, the adjacent skin mobilized and sutured.



DONT' S

1. Don't get excited and act hurriedly.
2. Don't give morphine to:
  - (a) An unconscious man.
  - (b) A man with a head injury.
  - (c) Don't give morphine indiscriminately.  
Let pain be your guide and don't give more  
often than one (1) syrette every three hours.
3. Don't leave any tourniquet on for over ten minutes. Release it at the end of that time and then, if necessary, reapply it.
4. Don't apply pressure to "Pressure Points" in the neck.
5. Don't ever pick up any injured man until the extent of his injuries have been determined, especially if he is unconscious. Never pick up an unconscious man, or one whose back has been injured, unless he can be lifted in such a manner that he is moved as a whole and transported easily in the horizontal position.





ABANDON SHIP ROUTINE

1. Put on the warmest clothing available, preferably wool, especially on the feet.
2. Fill clothing and boots with lubricating oil, the heavier the better.
3. Eat sugar, candy, chocolate, or other light concentrated food and drink some fresh water.
4. Make sure life jacket is properly adjusted.
5. Jump into the water, or climb down a cargo net or a line. DON'T DIVE !!! Leave the forward part of the ship or the leeward side, unless the ship is a tanker, then clear to the windward side.
6. Don't try to swim. Join a group and stay with them. If possible get a raft or lifeboat.
7. Before rescued, remember to try to keep the circulation going in your feet. While in the water, keep moving your toes. When in a boat, weather permitting, expose your feet to the air and massage them.
8. DON'T DRINK ANY SALT WATER !!!!!

# ABANDON SHIP ROUTE

1. Put on the warmest clothing available, preferably wool, especially on the feet.
2. Fill clothing and boots with insulating air, the heavier the better.
3. Eat sugar, candy, chocolate, or other light concentrated food and drink some fresh water.
4. Make sure life jacket is properly adjusted.
5. Jump into the water, or climb down a cargo net or a line. DO NOT DIVE!! Leave the forward part of the ship or the leeward side, unless the ship is a tanker, then climb to the windward side.
6. Don't try to swim. Join a group and stay with them. If possible get a raft or lifeboat.
7. Before rescued, remember to try to keep the circulation going in your feet. While in the water, keep moving your feet. When in a boat, weather permitting, expose your feet to the air and massage them.
8. DO NOT BELIEVE ANY RADIO MESSAGE!!!!



NATIONAL LIBRARY OF MEDICINE  
Bethesda, Maryland

